THE IRON TRADE REVIEW

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STRONGER TONE

MANIFESTED IN THE PIG IRON MARKET,

But No Heavy Sales Reported—Insistent Demand for Delivery of All Kinds of Products.

The pig iron market shows considerable improvement in tone. While no large sales are reported, there is a general increase of interest on the part of buyers, and some heavy inquiries, including one from the Allis-Chalmers Co. for from 10,000 to 15,000 tons, are pending. The Steel Corporation has purchased 16,000 tons of Bessemer from the Bessemer Association on the option obtained at the close of the old year, the price being $17.25, valley. This purchase takes all the iron the association has to sell for the first quarter. The foundries are busy and the prices of foundry grades are somewhat stronger. Basic is not as active as it has been.

Hoop Price Advanced. Bar iron continues to show much irregularity, and prices as low as $33.00 at the mill have been reported, although the leading manufacturers quote considerably higher. The price of hoops has been advanced $1.00 per ton.

Finished Materials. New business in finished material is not as heavy, but the demand for delivery is insistent. Specifications show that building permits are about 50 per cent heavier than for last year, and that in spite of the fact that a large amount of building has been done this winter there will be great activity during the spring and summer. Sales of structural material include 4,000 tons of shapes for new lake vessels, while the same vessels will require about 14,000 tons of plates. Deliveries are somewhat easier on plates, but the mills have all they can do and in the east premiums of $2.00 per ton are obtained on some business. Electric railways have been heavy buyers of rails during the past week. The buying of track materials continues at a lively rate. Steam railways are specifying heavily on the large purchases of standard sections which they have made.

Strong Demand for Wire. The pressure for delivery of wire and wire products is unabated and stocks are low. Good weather has been very favorable for the users of these products. New business in sheets is rather light and there is still evidence of pretty strong competition on the part of the independents, but specifications are coming in freely.

Coke Market Is Dull. There is very little activity in the coke market. It is believed that if the strike of coal miners should be declared it will not affect the Connellsville region to any great extent.

Scrap Prices Are Soft. Country dealers in old material are selling freely at lower prices and the railroads are also offering large quantities. Prices are very soft and the demand is limited.

BLOWING ENGINES

For the Steel Corporation.—Bar Iron Makers Denounced.

(Special Correspondence.)

Milwaukee, Wis., Feb. 13.—Another delegation of heads of operating departments of the United States Steel corporation visited Milwaukee last week, the party including A. R. Hunt, Harry Stevens, Pittsburg; Thomas McDonald, J. A. McDonald, B. R. Shover, John Haltz and H. D. Thompson, Youngstown, O. Immediately after their departure it was announced that J. Freeman Murray of Pittsburg had closed a contract under which the Allis Chalmers Co. will furnish sixteen large blowing engines for the United States Steel Corporation furnaces. The order is said to be one of the largest of the kind ever placed. Further details are withheld for the present.

The Wisconsin Retail Hardware Dealers' association, the second largest body in its national organization, in convention in Milwaukee, protested against the passage of a parcels post bill and scored manufacturers of bar iron for alleged attempts to hold up the dealers. The resolution relating to bar iron manufacturers is as follows:

"Resolved, that the action of the manufacturers of bar iron in compelling the retail dealers to purchase large quantities of each size of iron in order to secure a reasonable price on iron should be rescinded, and we hereby authorize and direct our secretary to request the national association to make an urgent request to have them do so."

W. H. Nimick, J. B. Shea and Otis H. Childs of Pittsburg, Pa., have offered $90,000 for the plant and assets of the Brown Corliss Engine Co., of Cudahy, Wis., now in bankruptcy court.

HEAVY ORDERS

Placed with the American Bridge Co.—Large Tonnage in Prospect.

New York, Feb. 14.—The American Bridge Co. booked during the week orders calling for between 17,000 and 18,000 tons of material mostly on jobs already mentioned in these columns. The most considerable new contract involves 700 tons of steel for the Monongahela & Southern R. R.. The company's shops are now well along with the work in hand and all contract dates are being kept. The season for bids on structural work has opened up rather earlier than usual especially in the Pittsburg district, where construction requiring upward of 100,000 tons of material is already awaiting for bids. In the east the week has brought forth very little actual business but the tonnage upon which leading interests are preparing estimates is enormous.

Among rail sales reported are the following: Boston and Maine, 5,000 additional, making its total 30,000; New Orleans and Great Northern 5,000; Chesapeake & Ohio another 5,000; Penna R. R. another 12,000; trolley tonnage about 10,000; trolley purchases are likely to reach the record of 1903.

Presque Isle Purchased.—The Cleveland Cliffs Iron Co., Cleveland, has purchased the Presque Isle property on the Maumee river, adjoining a large acreage which it has been accumulating for some time. The land is well situated for manufacturing purposes, but the company has no intention to build soon.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Corporation Buys Bessemer.—Urgent Demand for Delivery.

OFFICE OF *The Iron Trade Review*,
521 PARK BUILDING, February 13.

Aside from the exercising by the United States Steel Corporation of its remaining option of the available Bessemer pig iron for first quarter delivery and the urgent demand of the consumers of finished material for deliveries on the specifications against old contracts, there has been nothing worthy of more than passing mention in the market situation of the Pittsburg district in the week under review. The corporation's pig iron purchase was from the Bessemer Association and consisted of about 16,000 tons for February and March delivery at $17.25 valley furnace, the same price paid for other pig iron bought by the corporation. The only advance on finished material during the week has been on hoops, and this consisted of $1.00 per ton or an advance from 1.85c to 1.90c base f. o. b. Pittsburg, carload lots, or two cents less in less than carload lots.

Pig Iron.—While the actual sales during the week have been comparatively little, there are several good inquiries in the market, and some of these are for second half delivery. There is an intimation that several of the blast furnaces on Bessemer iron will have to discontinue before the opening of navigation on account of the scarcity of Bessemer ore and until they can get a new supply from the mines will have to work on foundry, forge and basic. A new producer is now in the market for second half delivery. This is the Midland Steel Co. which is building a large plant at Midland, Pa., 20 miles below Pittsburg on the Ohio river. The furnaces will be producing July 1.

Bessemer Valley	$17.50 to 17.75
Bessemer, Pittsburg	18.35 to 18.60
No. 1 Foundry, Pittsburg	18.50 to 19.00
No. 2 Foundry, Pittsburg	18.10 to 18.35
Gray Forge, Pittsburg	17.35 to 17.60
Basic, Valley	17.00 to 17.25
Basic, Pittsburg	17.85 to 18.10

Rails and Track Material.—The demand for light sections during the past week has been extremely satisfactory, and a good tonnage has been placed with the mills. For sectional under 70 pounds, a good delivery is now promised. In fact, better than for a long time past. New business on standard sections aggregating about 17,000 tons has been done in small lots. We continue to quote:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; light rails, 16 pounds, $30; 20 pounds, $28.50 to $29; 25 to 45 pounds, $28; angle bars for standard sections, 1.50c; spikes, $2.05 to $2.10.

Structural Material.—The structural mills are for the first time beginning to see daylight ahead, and last week the bookings were considerably less than the tonnage output. This may be simply a coincidence, or it may be an indication that the demand is about to show some decrease. We quote:

Beams and channels, 15 in., and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.75c; angles from 3 to 6 inches, inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches, and wider, 1.60c base.

Pipes and Tubes.—Pipe makers are pretty well filled up on old contracts and specifications are coming in freely, but, no new business of any particular note has been placed. We quote consumers' carloads. The jobbers' carloads are one point higher discount.

	Steel		Iron	
Consumer's Carloads	**Black**	**Galv.**	**Black**	**Galv.**
⅛ and ¼ inch	71	55	67¼	51⅓
⅜ inch	73	59	69½	55⅓
½ inch	75	63	71½	59½
⅝ to 6 inches	79	69	76	66
7 to 12 inches	74	59	71	55⅓
EXTRA STRONG PLAIN ENDS.				
⅛ to ⅜ inch	64	52	60½	48⅓
½ to 4 inches	71	59	67½	55⅓
4½ to 8 inches	67	55	63½	51⅓
Double extra strong plain ends, ½ to 8 inches	60	49	56½	45⅓

MERCHANT BOILER TUBES, CARLOADS, 22 FEET AND UNDER.

	Steel	Iron
1 to 1¼ inches	46	41
1½ to 2¼ inches	58	41
2½ inches	60	46
2¾ to 5 inches	66	53
6 to 13 inches	58	41

Less than carload lots two points less.
2½ inches and smaller, over 18 feet, 10 per cent net extra.
2¾ inches and larger, over 22 feet, 10 per cent net extra.

Billets.—The demand for steel billets has not been as sharp during the past week as heretofore; $27.50 Pittsburg is the market. The sellers are not offering any and there is very little business being done.

Ferro-Manganese.—The ferro-manganese situation is not nearly as serious as some people have led the consumers to believe. While carload lots have during the past week sold as high as $165, the market for forward delivery the latter part of April and May is probably less than $100, and importers who have been commanding enormous prices during the past three months are liable to receive a severe shock in unexpected quarters within the next month.

Skelp.—The mills are pretty well filled up on new business, and the new tonnage is light. We continue to quote prices unchanged: Bessemer grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; basic, grooved, 1.65c to 1.70c; sheared, 1.70c to 1.75c; iron skelp, grooved, 1.65c to 1.70c; sheared, 1.80c.

Tin Plate.—Specifications against contracts are heavy, but new contracts are not coming in very freely.

We quote: $3.50 per base box, f. o. b. Pittsburg, 14 x 20 100-pound cokes, terms 30 days, less two per cent off for cash in 10 days. Some mills allow a 5c per box rebate on this price to the large trade.

Sheets.—New business is rather quiet, but demand for shipment is urgent. We quote:

American Bessemer steel sheets, box annealed, cold rolled, one pass: Nos. 11-12, 2c; Nos. 13-14, 2.05c; Nos. 15-16, 2.10c; Nos. 17-21, 2.15c; Nos. 22-24, 2.20c; Nos. 25-26, 2.25c; No. 27, 2.30c; No. 28, 2.40c. Galvanized, Nos. 10-11, 2.35c; Nos. 12-14, 2.45c; Nos. 15-16, 2.55c; Nos. 17-21, 2.70c; Nos. 22-24, 2.85c; Nos. 25-26, 3.05c; No. 27, 3.25c; No. 28, 3.45c. Corrugated roofings, 1.70c per square for No. 28 painted, 2½-inch corrugation; 3.05c per square for No. 28 galvanized, 2½-inch corrugation. Quotations f. o. b. Pittsburg on large lots.

Merchant Steel.—The demand continues in good volume, and as in the case of other finished materials, the demand for delivery on specifications is very heavy. The majority of the producers are maintaining the card rate, but in some instances, a premium of from $3.00 to $4.00 a ton is being obtained. We quote:

Cold rolled and ground shafting, 50 per cent off in carload lots, and 45 off in less than carloads, delivered in base territory; tire steel, 1.70c to 1.80c; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flat, 1.50c to 1.55c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.05c to 2.10c. The price of planished and machine straightened tire is 1.70c base half extras as below. Iron finished tire up to 1½ inch by ½ inch 1.65c base half extra tire list. Iron finished tire 1½ inch by ½ inch and over to be sold on regular bar basis of 1.50c base, half extra steel card.

Merchant Bars.—The demand for common iron bars has fallen off appreciably, and producers are not particularly anxious for business at the prevailing prices. This does not however, apply to refined iron bars.

We quote: Common iron bars, 1.85c to 1.90c carload lots, 1.95c less than carloads, delivered Pittsburg; hoops, 1.90c in carload lots, and 2.00c in less than carload lots, with regular hoop card for extras. Bands, 1.50c; Bessemer steel bars, 1.50c; open-hearth steel bars, 1.50c; plow and cultivator, 50c net; channels, angles, zees and tees

under 3 inches, 1.60c all f. o. b. Pittsburg. The following differentials are maintained on steel; less than 2,000 pounds, 10c advance; less than 1,000 pounds of a size, 30c advance.

Wire and Wire Nails.—Mills are running full, but the expected advance has not been announced. We quote:

Wire nails, jobbers' carload lots, $1.85; retailers' carload lots, $1.90, and less than carload lots, $2; painted barb wire, $2 for jobbers in carloads; retailers in carloads, $2.05, and less than carloads, $2.15, with 30c for galvanizing; plain wire $1.70 to jobbers and $1.75 by carload.

Coke.—The coke market has materially strengthened during the past week, and no quotations for prompt delivery have been made less than $2.25 to $2.40 on furnace coke, and $2.75 to $3.00 on standard foundry coke. The estimated output of the Connellsville district for the week ending Feb. 3 was 283,069 for the Connellsville district proper, and 95,444 for the lower Connellsville district.

Muck Bar.—A large local producer came into the market during the week, and offered a round tonnage at less than $30 delivered Pittsburg. He was unable to find a buyer. No contracts of any note have been reported during the week.

Rods.—The principal producers are practically out of the market, and have withdrawn all quotations, except as an accommodation to old customers.

Plates.—Deliveries on plates have appreciably improved, due to the lighter volume of new business and also lighter specifications against old contracts. This condition applies as well to other finished lines and has just begun to make itself felt. We quote as follows:

Tank plate ¼ inch thick, 6¼ to 100 inches, 1.60c f. o. b. mill, Pittsburg. Extras are as follows per 100 pounds, boiler and flange steel plates. 10c; A. B. M. A. and ordinary firebox steel plates, .20c; still bottom steel. .30c; marine steel, .40c; locomotive firebox steel, .50c; all sketches excepting straight taper plates. varying not more than 4 inches, in width at ends. narrowest end not being less than 30 inches, .10c; complete circles, .20c. Plates in width over 100 inches up to 110 inches, .05c; over 110 inches up to 115 inches, .10c; over 115 inches up to 120 inches, .15c; over 120 inches up to 125 inches, .25c; over 125 inches, up to 130 inches, .50c; over 130 inches, 1.00c. Gauges under ¼ inch to and including 3-16 inch plates on thin edges, .10c; under 3-16 inch to and including No. 8, .15c; under No. 8 to and including No. 9, .25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Old Material.—Scrap continues to be about the only really weak feature in the market, and we note a still further decline of 25 cents during the past week. The B. & O. Railroad and the Pennsylvania Railroad have come into the market with heavy lists, and the list of the B. & O. contains a single item of 4,500 tons of old rails suitable for rerolling. We quote:

Heavy melting stock, $15.75 to $16; old steel rails, long lengths, $17 to $17.50; No. 1 cast scrap, $15.50 to $15.75; cast scrap borings, $9.75 to $10.00; bundled sheet scrap, $14.00 to $14.50; No. 1 railroad wrought scrap, $18.50 to $19; No. 1 yard faggoting scrap, $17.50 to $18.25; low phosphorus scrap, $20.50 to $21.50; wrought turnings, $13.00 to $13.25; busheling scrap, $14.75 to $15.25; iron axles, $26.50 to $27.00.

The E. Stebbins Mfg. Co., Springfield, Mass., has been sold by H. M. Brewster and his associates to Frederick Harris, L. J. Powers, F. L. Chapin and A. H. Warner. The company is capitalized at $50,000 and employs about 150 men, manufacturing brass goods. A. H. Warner will remain as treasurer and E. P. Marsh as superintendent, the business being continued along the same lines as heretofore. Major Brewster retires after a connection of 28 years with the concern.

Large Cincinnati Fire.—The plant of the L. Schreiber & Sons' Co., Cincinnati, was almost completely destroyed by fire Feb. 10, the loss being in the neighborhood of $250,000. The building which was wrecked was a two-story brick and steel structure, heavily stocked with structural work ready for delivery for a number of building enterprises in Cincinnati and elsewhere. Contracts on hand, however, will be promptly filled from the Norwood plant of the company where the entire business may be removed.

The Superior By-Products Co., of Pittsburg, has applied for a charter to do business under the laws of Pennsylvania, and manufacture building material from blast furnace slag, claiming this new material will in time largely displace cement in building construction. Details of operation will not be made public until after the charter has been granted. The incorporators of the company are: Geo. L. Folger, Edward P. Russell, and Henry H. Freeman.

It is announced that the Thew Automatic Steam Shovel Co., Lorain, O., will double its capacity by constructing additional machine, forge and foundry buildings.

Dr. Leith's Predictions.—According to the views of Dr. C. Kenneth Leith, professor of geology in the University of Wisconsin, expressed in a lecture last week before a Chicago society, the present known deposits of high grade iron ore in the United States will be exhausted in a comparatively short time and then the low-grade deposits will be drawn upon, the result being a change in the geographical location of the great steel and iron plants of this country. One hundred years will probably see the exhaustion of the world's present iron ore sources. "It is probable that the entry of low-grade ores into the iron industry will have the effect of bringing the furnaces nearer the base of supply," said Dr. Leith, "and this means the removal of the iron centers from Pittsburg and other eastern points to Chicago and points farther west. There are deposits of low-grade ore in Colorado and Wyoming, but it will be many years before they will become factors of commercial importance."

Skelp Bar Mill for Sale.—Spang, Chalfant & Co., Inc., Peoples Bank, Pittsburg, is offering for sale its 12-inch skelp bar mill at Sharpsburg, near Pittsburg. This mill is in first class condition and is equipped with a 500-horsepower Buckeye engine and rolls for 1¼ to 9⅜ inch wide inclusive. This mill was built by the Lewis Foundry & Machine Co. In addition to the complete mill the company has 76 extra rolls, 60 of which have been turned and 16 are in the rough. The mill may be seen at the Sharpsburg works or particulars secured from the company's officers in Pittsburg.

Heavy Building Operations.—According to the *Construction News*, building operations are upon a higher level than ever before. During January in 32 of the leading cities permits were issued for the construction of 7,323 buildings involving a total cost of $37,891,058, against 5,166 buildings at a cost of $25,074,661 for the corresponding month a year ago. This is an increase of slightly more than 50 per cent. The extremely open winter was doubtless the main factor in this heavy gain.

Opportunity for Pipe Foundry.—There is stated to be a good opportunity for the establishment of a pipe foundry for the manufacture of soil and small size cast iron pipe, in Duluth, Minn. Over 12,000 tons of this material have been contracted for already this year, and probably a still larger quantity will be needed.

CHICAGO.

Improvement in Tone of Pig Iron Market.—Heavy Inquiries Pending.

Office of *The Iron Trade Review*,
1164 Monadnock Block, February 13

There is little change in the character of the market this week. Of the products that have been soft, pig iron shows the strongest tendency to harden. The rapid consumption, slow deliveries and the advance in southern freight rates next month have all aided in the strengthening process. No change in prices has yet occurred, but there is less disposition to shade the market than was evident a week ago. Among the inquiries received is one from the Allis-Chalmers Co. for 10,000 to 15,000 tons. Specifications and new tonnage for finished material are very heavy and continually to the full capacity of mills. Hoops were advanced Feb. 10 $1.00 a ton, making base price Chicago delivery 2.06½c for carload lots. The demand for tubular goods is especially promising, recent sales including 3,000 tons of culvert pipe to western railroads, and a round tonnage of gas and water pipe to various municipalities and gas companies. The American Shipbuilding Co. has closed with the corporation for the steel for the three boats mentioned last week, these requirements being estimated at 18,000 tons. The plates involved comprise about 14,000 of this tonnage which will be rolled at South Chicago. Specifications for plates have improved in the last week and the Illinois Steel Co. has now ample tonnage on its books for immediate rolling, including the 2,000 tons required in the construction of the boat let two weeks ago. New rail business is almost wholly from electric roads, the contracts from this source aggregating 12,000 tons. Specifications for standard sections and track supplies from steam roads are heavy. There is also a strong movement in sheets and tin plate, buyers pressing mills hard for deliveries. Bar iron has lost the buoyancy it had a week ago and desirable tonnage can be placed at less than 1.75c Chicago. Inquiry continues light, though the consumption, as evidenced by the specifications, shows no diminution. Scrap remains soft and trading its at a miniumum. The Baltimore & Ohio, Pennsylvania and Rock Island roads have out large lists of materials for sale, one item for 4,500 tons of relaying rails being mentioned in the B. & O. list. There is only moderate activity in coke. Prices are without notable change, except Solvay, which is offered at $5.80 Chicago for immediate shipment.

Pig Iron.—Negotiations are under way for a very large tonnage of pig iron for second and third quarter delivery, this including an inquiry from the Allis-Chalmers Co. for 10,000 to 15,000 tons, divided between northern and southern iron. Within the past ten days, a distinct change for the better has come over the local market, and there is not nearly so much talk heard now of $14 for No. 2 southern iron. The firm stand taken by the leading producers against lower prices, as well as the great underlying strength of the market, which has asserted itself since the softness commenced, is largely responsible for the improved conditions. The inquiry for forward delivery is heavier than had been anticipated, and in the analysis of the situation by the seller there is no room under present conditions for a weak market. Today it is doubtful if even a large tonnage could be placed at less than $14.50 Birmingham for No. 2 foundry with southern furnaces, or at less than $19 furnace for the same grade with northern stacks, although a week ago these quotations were common. We quote as folows:

Lake Superior charcoal	$20.00 to 20.50
Northern Foundry No. 1	19.50 to 20.00
Northern Foundry No. 2	19.00 to 19.50
Northern Foundry No. 3	18.50 to 19.00
Northern Scotch Foundry	19.50 to 20.00
Ohio Strong Softeners No. 1	20.30
Ohio Strong Softeners No. 2	19.80
Southern Foundry No. 1	18.15 to 18.65
Southern Foundry No. 2	17.65 to 18.15
Southern Foundry No. 3	17.15 to 17.65
Southern Foundry No. 4	16.90 to 17.40
Southern No. 1 Soft	18.15 to 18.65
Southern No. 2 Soft	17.65 to 18.15
Southern Gray Forge	16.65 to 16.90
Southern Mottled	16.40 to 16.65
Southern Silveries (4 percent to 6 percent Silicon)	19.15 to 19.65
Jackson Co. Silveries, 6 percent = 8 to 10 percent Silicon	22.30 = 23.30 to 24.30
Alabama and Georgia Car Wheel	22.65 to 23.15
Malleable Bessemer	19.50 to 20.00
Basic Iron	18.65 to 18.90

Coke.—Only moderate activity is displayed in the local coke market. The reports that the pending coal strike will not touch the mines from which Connellsville and Alabama ovens draw their coal has reassured western consumers and very little uneasiness is displayed over the possibility of not getting sufficient supplies. There is not the abundance of spot coke offered as formerly, but melters are buying it freely wherever offered. For forward deliveries, trading is quiet, and prices for standard 72-hour Connellsville brand range from $3.25 to $3.50 at ovens. Solvay by-product coke is softer and is now quoted at $3.15 ovens, or $5.80 Chicago.

Billets and Wire Rods.—Demand for forging billets is very brisk. Owing to the limited tonnage for sale by the local mill, prices remain strong at $35 to $36 Chicago. There is some variation in the price of wire rods. The "official" quotations are unchanged at $33 Pittsburg for Bessemer and $34 for basic, but in lots of 1,000 tons a price as low as $31.50 for Bessemer has been named in the week under review by an independent seller. Despite this concession, however, the leading producer is holding firmly to its schedule, having considerable difficulty in filling the orders already taken.

Iron and Steel Bars.—Effective Feb. 10, hoops were advanced $1 a ton, making base price, carload lots, 1.90c Pittsburg, or 2.06½c Chicago. Bar iron is weaker and is now quoted at 1.75c Chicago. There is considerable competition among the smaller class of mills for business, and a desirable tonnage could doubtless be placed at even a better price than the foregoing. No change is noted in steel. Specifications are very heavy and deliveries slow owing to the large tonnage on mill books. Stocks in consumers' hands are low, and supplementary orders are frequent. We quote carload lots, Chicago, delivery, as follows: Soft steel bars and bands, 1.66½c half extras; soft steel angles, less than 3 x 3, 1.76½c; hoops, 2.06½c base, full extras; old rail stock, 1.70c to 1.80c. There is a good movement from local warehouses and jobbers' prices are firm. We quote bar iron, 2.25c full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛-inch and thicker, $2 per 100 pounds base; flats, 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half ovals and half rounds, $2 per 100 pounds base; steel bands, $1.95 to $2.00 half extras; soft steel hoops, $2.30 to $2.40 full extras. Other sizes not mentioned above, $1.85 per 100 pounds base, plus half extras.

Merchant Steel.—The demand for merchant steel is of the strongest kind. Specifications are continually in excess of contract requirements which mills are unable to ship promptly owing to the large delinquent tonnage already on their books. Despite the unwillingness to add to their present obligations, producers have been forced to take care of the supplementary orders of some of the more insistent of their customers, whose old contracts have been completed and whose stocks are low. This unusual activity is due largely to the early opening of the spring implement trade as a result of the warm weather. Prices are without change, mill shipments being quoted as follows:

Spring steel, 2.10c; sleigh shoe, flat sizes, 1.71½c; concave and convex, 1.86½c; cutter shoe, 2.35c to 2.40c; smooth finished machinery steel, 1.91½c; smooth finished tire, 1.86½c base; plow steel, 2.20c and upward, according to quality; toe calk steel, 2.21c; railway spring, 1.86½c. Cold rolled shafting, 50 per cent off in carload lots and 45 per cent in less than carload lots. Crucible tool steel,

6½c to 8c; special grades of tool steel, 13c and up.

Cast Iron Pipe.—Two railroad contracts for culvert pipe aggregating 2,000 tons, were placed with the leading maker last week. The municipal contracts from South Bend, Ind., and Toledo, O., for 500 tons of water pipe each, were also placed with this interest. The demand for gas pipe continues brisk being especially heavy from the districts where the weather is mild. Prices are without change, as follows: 4-inch water pipe, $31; 6, 8, 10 and 12-inch, $30; larger sizes, $29.50; gas pipe $1 extra.

Structural Steel.—The pressure for material is of the insistent kind. On new business, six months is the earliest shipment that can be obtained from leading maunfacturers, and this applies only to heavy beams and channels. On lighter material, from nine to twelve months' time is required. Chicago contractors are buying freely for forward deliveries, many covering for their prospective requirements in the first half of next year. The transactions this week included a contract from the American Shipbuilding Co. for the steel for four more boats, amounting altogether to nearly 4,000 tons, about two-thirds of which will go to structural mills of the Corporation. Prices are without change, as follows:

Beams and channels, 3 to 15 inches, inclusive, 1.86½c; angles, 3 to 6 inches, 1.86½c; angles, larger than 6 inches, on one or both legs, 1.96½c; beams, larger than 15 inches, 1.96½c; zees, 3 inches and over, 1.86½c; tees, 3 inches and over, 1.91½c, with the usual extras for cutting to exact lengths, punching, coping, bending, or other shop work. Quotations on lots from store are as follows: All angles, 3 inches and larger, $2.25 per 100 pounds base; tees, 3 inches and larger, $2.30 per 100 pounds base; 3, 4, 7, 8, 9, 12 and 15-inch beams, $2.25 per 100 pounds base; 5, 6 and 10-inch beams, $2.50 per 100 pounds base; 18, 20, and 24-inch beams, $2.35 per 100 pounds base; 3, 4, 7, 8, 9, 10, 12 and 15-inch channels, $2.25 per 100 pounds base; 6 and 10-inch, 15-pound channels, $2.50 per 100 pounds base; 12-inch, 20½ pound channels, $2.35 per 100 pounds base; 5-inch channels, $2.75 per 100 pounds base.

Rails and Track Supplies.—Electric railroads have bought rails freely in the week under review, their contracts aggregating from 10,000 to 12,000 tons. Steam roads are specifying heavily for standard sections and track supplies, the local mill being swamped with orders for prompt shipment. Light rails are in good demand, the output of western mills being taken for the next three months. Prices are without change as follows, all f. o. b. mill:

Heavy sections, $28; light rails, 12-pound sections, $31; 16-pound, $30; 20-pound, $29; 25-pound, $28; 30-pound and heavier, $27 to $28. Track supplies, angle bars, 1.50c to 1.75c; spikes, 2.10c; track bolts, 3½ x ¾, with square nuts, $2.55 to $3.00 per 100 pounds; with hexagon nuts, $2.70 to $3.15.

Merchant Pipe.—While the season for pipe has not yet opened, there is, nevertheless, a good volume of new business coming forward. This tonnage is made up largely of small orders intended for the replenishment of stocks in anticipation of an early spring trade. Prices are firm but without change. We quote carload lots, f. o. b. Chicago, ¾ to 6-inch black steel pipe, 78.35 per cent discount from list, and galvanized, 68.35 per cent. Minimum quotations from store are 76½ to 77 per cent discount on the base sizes, ¾ to 6-inch black steel pipe.

Boiler Tubes.—Trading is moderately active in tubes for forward delivery. There is also a good demand on jobbers for quick shipment. Prices are firm, official discounts being as follows:

	Steel	Iron	Seamless
1 to 1¼ inches	40.35	37.35	53.00
1¾ to 2¼ inches	54.35	39.35	40.00
2½ inches	56.35	44.35	43.00
2¾ to 5 inches	62.35	51.35	
Up to 4¼ inches			50.50
6 to 13 inches	52.35	37.35	

Less than carload lots, from store, as follows:

	Steel	Iron	Seamless Steel
1 to 1¼ inches inclusive	40	25	42½
1¾ to 2¼ inches, inclusive	50	25	35
2½ inches, inclusive	52½	35	30
2¾ to 5 inches, inclusive	60	47½	42½

Wire Products.—There is great pressure on manufacturers for early delivery of all wire materials. The consumption this winter has been very heavy owing to the mild weather, and stocks in all parts of the country are low. The practice of the leading maker in limiting contracts to 60 days' requirements has resulted in a steady volume of new business, and has also reduced to a minimum the danger of speculation in accumulated stocks. New tonnage today represents actual needs, the material being wanted invariably for immediate consumption. We quote carload lots to jobbers, Chicago delivery, as follows:

Wire nails, $2; painted barbed wire, $2.15; galvanized barbed wire, $2.45; smooth annealed wire, $1.85; smooth galvanized wire, $2.15; polished staples, $2.15; galvanized staples, $2.40. Carload lots to retailers, 5 cents higher than above prices; less than carload lots, 15 cents higher.

Sheets.—There is little change to note in sheets this week. Specifications are free and to full contract requirements. New tonnage is light. Deliveries from mills are slow, eight to twelve weeks being required on light gauges. Prices are without change, mill shipments, carload lots being quoted as follows:

Nos. 8, 9 and 10, 1.86½c; Nos. 11 and 12, 1.91½c; Nos. 13 and 14, 1.96½c; Nos. 15 and 16, 2.06½c. Box annealed, Nos. 18-20, 2.26½c to 2.31½c; Nos. 22-24, 2.36½c; No. 26, 2.41½c; No. 27, 2.46½; No. 28, 2.56½c; No. 29, 2.71½c; No. 30, 2.81½c. Jobbers' prices are as follows: No. 10, 2.15c to 2.25c; No. 12, 2.20c to 2.30c; No. 14, 2.25c to 2.35c; No. 16, 2.35c to 2.45c; Nos. 18 and 20, 2.50c to 2.55c; Nos. 22 and 24, 2.55c to 2.60c; No. 26, 2.60c to 2.65c; No. 27, 2.65c to 2.70c; No. 28, 2.70c to 2.75c; No. 30, 3.15c to 3.20c.

Quotations on galvanized shipments, carload lots, mill shipments, are as follows: Nos. 10-11, 2.51½c; Nos. 17-21, 2.86½c; Nos. 22-24, 3.01½c; Nos. 25-26, 3.21½c; No. 27, 3.41½c; No. 28, 3.61½c; No. 29, 3.86½c; No. 30, 4.11½c. From store, galvanized sheets are quoted as follows: Nos. 10 and 20, 3c to 3.10c; Nos. 22 and 24, 3.15c to 3.25c; No. 26, 3.35c to 3.45c; No. 27, 3.55c to 3.65c; No. 28, 3.75c to 3.85c; No. 30, 4.95c to 5c.

Plates.—Aside from the contract of the American Shipbuilding Co. for the steel for four more boats, which involves between 13,000 and 14,000 tons of plates, the activity in this product has not been of noteworthy proportions. Specifications are slightly better, but new tonnage is generally light. The independent makers continue to press their customers for shipping instructions, and are offering deliveries within one to two weeks. The ship building order will be rolled at the South Works of the Illinois Steel Co. We quote mill prices, Chicago delivery, as follows:

Tank steel, ¼ inch and heavier, up to 100 in. wide, 1.76½c base; flange steel, 1.86½c base; marine steel, 1.96½c base; all full extras. Plates 3-16 inch thick, $2 extra; gauges, 7 to 8, $3 extra; No. 9, $5 extra. Less than carload lots, $5 extra. Store prices are very firm. We quote from local stocks: tank steel, ¼ inch and heavier, up to 72 inches wide, 2c to 2.10c; 72 inches to 96 inches wide, 2.10c to 2.20c; 3-16 inch up to and including 60 inches wide, 2.10c to 2.20c; 3-16 inch 72 inches wide, 2.35c to 2.45c; No. 8, up to 60 inches wide, 2.15c to 2.25c; flange steel, 25c extra; heads, 25c extra.

Old Material.—The only transaction of interest this week was the sale of 1,000 tons by the Chicago & Rock Island railway. No improvement is noted in the local market

and prices continue soft. Consumptive demand is not worthy the name, and it scarcely exists, negotiations embracing only material that is offered at attractive prices. Country dealers are throwing their stocks on the market in part or in whole, fearing still lower values with the continuance of mild weather and the light trading in pig iron and bar iron. Material is very plentiful and the bottom of the market is not yet in sight. Car wheels and steel axles are the only two strong items on the list, and these are scarce, especially the former. We have revised our prices, and quote gross tons in the first paragraph, as follows:

Old Steel Rails (4 feet and over)	$16.50 to 17.00
Old Steel Rails (less than 4 feet)	16.00 to 16.50
Old Car Wheels	20.00 to 20.50
Old Iron Rails	22.50 to 23.00
Relaying Rails, subject to inspection	27.50 to 28.00
Heavy Melting Steel	14.50 to 15.00
Mixed Country Steel	12.50 to 13.00
No. 1 R. R. Wrought	$16.50 to 17.00
No. 2 R. R. Wrought	15.50 to 16.00
Shafting	17.50 to 18.00
Dealers' Forge No. 1	12.50 to 13.00
Wrought Pipe and Flues	12.00 to 12.50
No. 1 Cast, 150 pounds and less	13.50 to 14.00
No. 1 Mill	9.00 to 9.50
No. 1 Busheling	11.50 to 12.00
No. 2 Busheling	11.00 to 11.50
Country Sheet	8.50 to 9.00
No. 1 Boilers Cut	12.00 to 12.50
Boiler Punchings	14.50 to 15.00
Iron Car Axles	23.00 to 23.50
Steel Car Axles	20.50 to 21.00
Iron Axle Turnings	12.00 to 12.50
Cast Borings	9.50 to 10.00
Mixed Borings, etc.	9.50 to 10.00
Machine Shop Turnings	11.50 to 12.00
Railroad Malleable	14.50 to 15.00
Agricultural Malleable	13.00 to 13.50
Stove Plate and Light Cast Scrap	11.00 to 11.50
Old Iron Splice Bars	18.50 to 19.00

CLEVELAND.

Pig Iron Quiet, but Foundries Anxious for Shipments.—Scrap Weaker.

OFFICE OF *The Iron Trade Review*,
BROWNING BUILDING, February 13.

Iron Ore.—The movement of ore from docks has been somewhat checked by the inclement weather of the last week, but in spite of the fact that the movement this winter has been light, furnaces are, as a rule, well supplied. The needs of nearly all in this state are covered through the winter season and practically no ore is selling or for sale. The fact that the Pittsburg Steamship Co. has covered for its additional tonnage for the coming season without drawing as heavily as was generally expected on outside fields has revived discussion on the question of whether the building of lake freighters is not on a heavier scale than the increase of ore shipments would warrant. In spite of the fact that a number of its vessels which were damaged by the storms late in the past season will not be available until well along in the coming summer, the Pittsburg company will enter the season with a working tonnage considerably in excess of that of 1905. Independent shippers, however, are of the opinion that the amount of "wild" ore which will be carried the coming summer will be largely increased over that of last year. No trouble with labor is anticipated on the lakes this season and preparations are making for an early opening of navigation.

Pig Iron.—The market continues the quiet tone which it assumed soon after the holidays and current business is almost entirely made up of the filling of small orders for immediate shipment. Foundries are generally well supplied, but the extent to which they are being driven is apparent in their insistent call for iron whenever a furnace which is supplying them is forced out of blast. They are evidently melting on narrow margins and must buy considerable iron to carry them through the first half. If there has been any noticeable tendency as regards prices during the past week, it has been in the direction of strengthening them, although quotations are practically unchanged. Some Bessemer iron has sold as low as $17.25, valley, for prompt shipment, but a consumer with larger requirements was unable to shade $17.50 on competitive bidding. Foundry iron prices for current business have stiffened and $17.50 valley can not be shaded to any great extent, if at all. The present period of quietness is expected to continue until well along in March, when the buying for the second half should naturally begin. Some few purchases for delivery later than July 1 are being closed, in all cases at present prices or slightly above. Southern iron has established itself at $14.00 Birmingham for No. 2 with certain large interests continuing to quote $14.50. Coke has responded sharply to the threatened coal strike and is now firm at $2.35 to $2.50 for furnace grades and $3.00 to $3.25 for foundry grades. We quote, Cleveland delivery, as follows:

Bessemer	$18.10 to 18.35
No. 1 Foundry	18.00 to 18.50
No. 2 Foundry	17.50 to 18.00
No. 3 Foundry	17.00 to 17.50
No. 2 Southern	17.85 to 18.35
Gray Forge	16.35 to 16.85
Gray Forge, Southern	15.85 to 16.35
Lake Superior charcoal	19.50 to 20.00

Finished Materials.—The Van Dorn Iron Works Co., Cleveland, will furnish the structural material for the new automobile works of the White Sewing Machine Co. About 1,500 tons will be required. The strongest feature of the market is the insistent demand for structurals. Mills report specifications against contracts as extremely heavy and jobbers are finding no let up in the request for shipments from stock. Building operations for January were 50 per cent in advance of the corresponding month in 1905 and promise a continuance of the remarkable activity in this line. In sharp contrast is the situation in plates, steel bars and iron bars. In both plates and steel bars an easier tone prevails and better shipments are procurable. Bar iron has responded to the further slump in scrap and quotations as low as 1.65c are reported with the leading interest quoting 1.85c Youngstown. The market is weak and a further sag is expected. Sheets are in strong demand and some premium business is being done. Forging billets have been selling briskly at $36.00 at the mill. Light rails are obtainable for early delivery and are selling fairly well.

Old Materials.—The scrap market has grown decidedly weaker during the past few days and quotations have generally declined about 50 cents per ton with trading exceedingly light. Practically all current business is being done by brokers who had sold short and are now covering their needs. There is no strengthening feature in the situation, the unprecedentedly mild weather having exerted a demoralizing influence which it is now too late for whatever colder weather may come to remedy. We quote f. o. b., Cleveland as follows:

Old Iron rails	$22.50 to 23.50
Old steel rails (over 6 feet)	16.25 to 16.75
Old steel rails (under 6 feet)	16.50 to 17.50
Old car wheels	17.00 to 17.50
Steel boiler plate	13.00 to 14.00
Steel axles	21.00 to 22.00
Malleable iron (railroad)	15.50 to 16.50
Malleable iron (agricultural)	14.00 to 15.00
Heavy steel	15.50 to 16.00

We quote as follows, net tons:

No. 1 R. R. wrought	15.50 to 16.50
No. 1 busheling	13.00 to 14.00
No. 1 machine cast	13.25 to 13.75
Iron axles	22.50 to 23.50
Axle turnings	11.00 to 12.00
Wrought turnings (free from cast)	10.50 to 11.50
Grate bars	9.50 to 10.00
Pipes and flues	12.00 to 13.00
Tank iron	10.50 to 11.00
Hoop and band iron	7.50 to 8.00
Sheet iron	6.50 to 7.00
Wrought drillings	12.50 to 13.50
Stove plate	10.50 to 11.00
Cast borings	8.00 to 8.50

NEW YORK.

Pig Iron Market Waiting.—Amount of Business Only Fair.—Heavy Demand for Shapes.

OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., February 12.

Pig Iron.—New business has been of only fair volume during the week. Suspicions of weakness are, however, nowhere to be found. Consumption maintains its high level and conditions are those which always prevail in the interval between heavy buying movements. It is a waiting market with steady movement of metal to fill current demands. There have been the usual purchases of small lots for immediate consumption and calls for forward shipments on existing contracts show that the tonnage required by melters is as great as ever. Most large consumers seem to be well supplied for some weeks to come and are apparently disposed to await developments before entering into contracts extend-

ing any considerable distance into the future. The probabilities of a strike among the coal miners and its possible effect upon the market have been the subject of greatest interest in all circles this week. Thus far the only noticeable effect has been a slight stiffening in the tone of the coke market. The element of weakness noted for a few weeks past promptly disappeared when the strike cloud began to show upon the horizon. Orders for small lots of foundry coke ranging from 25 to 150 tons have been numerous and there have been a number of considerable size. Speculation and surmising about strike rumors and discussions show a commendable desire to minimize the possible effects. The opening of negotiations at this early date and the evident reluctance to bring the issue to an actual test of strength exhibited by the miners gives reason for the hope that trouble may be averted. President Mitchell of the mine workers who is to meet the coal operators in this city today, is said to carry only moderate demands. While a strike would undoubtedly disturb prices of pig iron, especially in the east, still it is believed that in the present instance the effect would be comparatively small. Interference with transportation would be the only immediate cause of trouble, for the supply of coke and anthracite is practically assured. There were few large sales of foundry iron during the week. The following are a few of the smaller tonnages which in the aggregate amount to a fair volume of business: 400 tons No. 2 Pennsylvania; 200 tons No. 2 plain for delivery in March and April; 250 tons No. 2 northern; 150 tons No. 2 Alabama, at $14.50 Birmingham. Pump makers are again in the market for some 2,000 tons of special analysis irons divided into various lots and pipe founders are also looking for supplies amounting to several thousand tons. Contracts for 1,000 and 5,000 tons of cast iron pipe were awarded during the week. Ferro-manganese is easier. Another sale of 1,000 tons for delivery during the third quarter is reported.

Northern No. 1 Foundry	$19.00 to 19.50
No. 2 Foundry	18.50 to 18.75
No. 2 Plain	18.00 to 18.25
No. 1 Southern Foundry	18.75
No. 2 Southern Foundry	18.25
No. 3 Southern Foundry	17.25 to 17.75
No. 4 Foundry	17.00 to 17.25

Pig Iron Certificates.—Trading in certificates and warrants has been more active although actual transactions were still inconsiderable. Prices are if anything, slightly higher. A lot of 100 tons, regular, for March delivery was sold at $16.15, while 100 tons for April shipment brought $16.25. In warrants a lot of 100 tons Alabama No. 2 foundry was sold at $13.50. The prices for foundry warrants recorded on Saturday were as follows:

	Bid.
Cash	16.50
February	16.00
March	16.00
April	16.00
May	16.00
June	16.00

Finished Iron and Steel.—Although the demand for structural material present and in prospect is still increasing there were no contracts of any considerable size awarded during the past few days. The mills are so well supplied with orders that they are not anxious to entertain new proposals unless the conditions are favorable. Two additional office building projects were reported during the week and in view of the congested conditions of the structural mills it is becoming apparent that, if all the projects reported are to materialize, some of the builders will be obliged to wait for material. Plate makers also participate in the activity in the building industry. Three lots of plate for structural work aggregating 1,500 tons were sold during the week at prices ranging $2 a ton above the association figures. Rail sales have been of the normal volume without phenomenal features. The market for bar iron has not been very active. The following are the prices at tidewater: Angles, 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84¼c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.74½c; flange, 1.84½c; marine boiler, 2.41½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.64½c to 1.84½c; sheets, No. 28 black, 2.40c.

Old Materials.—The demand for scrap material of all kinds continues light and most dealers are holding prices at a slightly lower level. The arrival of belated winter weather will undoubtedly tend to improve conditions, but the supply on hand is already large and consumers seem to be satisfied that no early advance can occur. The following prices are approximate f. o. b. tidewater:

Old iron rails	$21.00 to 22.00
Old steel rails, long lengths	15.00 to 15.50
Old steel rails, short pieces	15.00 to 15.50
Relaying rails	22.00 to 23.00
Old car wheels	17.50 to 18.00
Old iron car axles	24.00 to 25.00
Old steel car axles	18.00 to 19.00
Heavy melting steel scrap	16.00 to 16.50
No. 1 railroad wrought scrap	19.00 to 20.00
Iron track scrap	17.00 to 18.00
Wrought pipe	14.00 to 15.00
Cast borings	10.00 to 10.25
Wrought turnings	14.50 to 15.50

CINCINNATI.

Slight Increase in Inquiries, But Little Change in Conditions.

Feb. 13

Pig Iron.—The market shows slightly more activity than in the preceding week, more particularly in the way of inquiry. There seems to be more interest shown by buyers, but this is only by way of comparison with the recent dullness. Sales have been small and mainly on the basis of $14.00 Birmingham for southern iron. There is an inquiry for 1,000 tons of gray forge in the Pittsburg territory on which the Cincinnati agencies are figuring, and from all indications there will be quotations of close to $12.00 Birmingham made on this order. A slight evidence of weakness in northern iron has come to light in a sale of No. 2 foundry at $17.25 f. o. b. southern Ohio furnaces. Malleable iron is reported as quiet. Southern charcoal iron and high silicon irons are slightly firmer under moderate supply.

The general situation is not changed in any essential way. Trade talk is more inclined to an early buying movement for second quarter requirements and this is supported by the slight increase in the number of inquiries received this week. Reports concerning consumption of iron continue to indicate that there has been no falling off in the melt. Consumers are calling for iron on contracts and there are practically no requests to hold up shipments. The probable effects of a coal strike are under discussion with varying opinions. Many consumers report to the traveling men for pig iron houses that they are covered for the first half of the year. It is generally believed that furnace stocks are moderate and the selling interests call the situation strong on this belief, especially as the consumption keeps up. It is asserted in other quarters that unless a buying movement sets in in the near future, the market will be likely to weaken. We quote f. o. b. Cincinnati as follows:

Southern Foundry No. 1	$17.25 to 17.50
Southern Foundry No. 2	16.75 to 17.00
Southern Foundry No. 3	16.25 to 16.50
Southern Foundry No. 4	15.25 to 15.50
Southern Foundry No. 1, soft	17.25 to 17.50
Southern Foundry No. 2, soft	16.75 to 17.00
Gray Forge	15.00 to 15.25
Northern Foundry No. 1	18.90 to 19.15
Northern Foundry No. 2	18.40 to 18.65
Northern Foundry No. 3	17.90 to 18.15
Jackson County Silvery, 8 per cent	21.15 to 21.65
Southern Charcoal	22.75 to 23.25

Finished Material.—The demand continues good and the market is firm at quotations: Bar iron is quoted at 1.80c to 1.85c and the recent advance in sheets is well sustained. We quote: steel bars at 1.63c, half extras, with dealers quoting 1.85c for iron and steel out of store. Galvanized sheets, No. 10 and No. 12, in car lots are 2.58c. We quote black sheets, No. 27 at 2.40c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.85c;

No. 27, 2.75c; No. 16, 2.35c; No. 14, 2.25c; No. 12, 2.15c. Tank plates are firm and sell out of store at 2 to 2.10c for ¼-inch and 2.10c for 3-16, Nos. 8 and 10. Beams and channels are quoted at 2.25c to 2.35c from stock and angles at 2.10c to 2.15c for base sizes.

In merchant pipe there is no change in prices and the leading interest still offers no quotations on wrought iron pipe. We quote f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts)

	Steel Pipe		Guaranteed Wrought Iron Pipe	
	Black Per cent	Galv. Per cent	Black Per cent	Galv. Per cent
⅛ and ¼ inches	69.7	53.7	....	....
⅜ inch	73.5	61.3	....	....
½ inch	73.7	61.7	....	....
¾ to 6 inches	77.7	67.7	....	....
7 to 12 inches	72.7	57.7	....	....

Coke.—The market shows more firmness and there has been more business the past week. Sales were mostly of foundry coke and for prompt shipment, as there is little being done in the way of contracts. We revise quotations in the various coke producing districts as follows:

†Wise County, Va. Furnace Coke prompt shipment	$2.50 per ton
Wise County, Va. Foundry Coke prompt shipment	3.00 to 3.25 per ton
Pocahontas Furnace Coke on contracts	2.50 per ton
Pocahontas Foundry Coke on contracts	2.75 to 3.00 per ton
Connellsville Furnace Coke prompt shipment	2.50 per ton
Connellsville Foundry Coke prompt shipment	2.90 to 3.15 per ton
New River Foundry Coke on contracts or prompt shipment	3.00 to 3.25 per ton
New River Furnace Coke, prompt shipment	2.50 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.65 per ton on $9.00 pig iron, plus 17 per cent of the advance on pig iron above $9.00 Birmingham

Old Material.—The impending coal strike is said to have steadied the market for old material, but there is no material change to be noted for the week. Dealers are pursuing a policy of buying and selling without holding for investment. Quotations are irregular. We quote f. o. b. Cincinnati as follows:

Old No. 1 railroad wrought, net tons	$17.00 to 17.50
Cast machine and foundry, net tons	14.00 to 14.50
Old iron rails, gross tons	20.00 to 21.00
Old steel rails, gross tons	15.00 to 15.50
Old short lengths, gross tons	15.50 to 16.00
Old iron axles, net tons	22.00 to 23.00
Stove plate, net tons	10.50 to 11.00
Wrought turnings, net tons	11.00 to 12.50
Cast borings, net tons	9.00 to 9.50
Car wheels, net tons	17.00 to 17.50

PHILADELPHIA.

Some Hesitancy, But Orders Come in Fair Volume.—Plates Higher.

February, 13.

Pig Iron.—The threatened strike of the coal miners, which still hangs like a cloud over the general business situation, is not likely, in the opinion of the best posted iron and steel men, to bring any shading of the present prices of pig iron. That may come about as a natural result of the enormous production and a slackening in consumption, but for the present the possibility of a great decrease in the supplies of coke and coal, with the necessarily higher prices to be asked, is looked upon as more likely to put pig iron prices up rather than down. Some people, however, do not take this view, and in the conflict of opinions prices remain stationary, until the question of a strike has at least been decided. There has been more hesitancy about the market, but orders still continue to come in in fair volume, stimulated doubtless in some cases by a desire to accumulate supplies against the danger of a strike. There has been some weakening in standard gray forge, but foundry irons continue generally in good demand, and basic and low phosphorus are scarce and firm, as they have been for some time. Prices may be quoted as follows:

No 1X Foundry	$19.00 to 19.50
No. 2X Foundry	18.50 to 18.75
No. 2 Plain	18.00 to 18.25
Standard Gray Forge	16.50 to 17.00
Basic	18.00 to 18.25
Low Phosphorus	24.50 to 25.50
Southern No. 2X, rail	18.75 to 19.00

Finished Material.—Plates have been marked up $2 a ton by the mills, to keep pace with the demand for all sorts of structural material for ship building, railroad work, building construction, etc., and the threatened strike appears to have had no effect on this branch of the industry. Bar iron is in easy supply, but in other lines the general activity shows no signs of slackening for several months to come. Prices may be quoted as follows: Beams, channels and angles, according to specifications, 1.82½c to 2.25c; refined iron bars, 1.75c to 1.85c; steel bars, 1.63½c to 1.83c; plates, 1.83½c to 1.88½c.

Old Material.—The scrap market shows no snap, and prices continue to decline in sympathy with bar iron and because of railroad embargoes and small demand from the mills. Concessions have been more general during the past week than for a long time, and prices may be quoted as follows:

Old steel rails	$17.50 to 18.00
No. 1 steel scrap	16.75 to 17.00
Old steel axles	20.50 to 21.00
Old iron axles	26.00 to 27.00
Old iron rails	23.00 to 24.00
Old car wheels	18.50 to 19.00
Choice scrap, R. R. No. 1 wrought	20.00 to 20.50
No. 1 yard scrap	18.00 to 18.50
Machinery scrap	16.00 to 16.50
Low phosphorus scrap	23.00 to 23.50
Wrought iron pipe	15.00 to 15.50
No. 1 forge fire scrap	15.25 to 15.75
No. 2 forge fire scrap, ordinary	12.25 to 12.75
Wrought turnings	13.75 to 14.25
Axle turnings, heavy	15.00 to 15.50
Cast borings	10.50 to 10.75
Stove plates	12.75 to 13.25

Every plant of the Tennessee Coal & Iron Co. broke records for output during January although no effort was made to do more than the usual amount of work.

BIRMINGHAM.

Prices of Pig Iron Firmer.—Good Weather Continues.

Birmingham, Ala., Feb. 12.—Southern pig iron quotations are inclined to look up again and it is predicted that in the next week or two the iron prices will have recovered from the slump which took place three or four weeks ago and in some quarters $14.50 per ton is being asked already for No. 2 foundry iron. There is a little better demand for the product, some good orders having been booked for delivery in the latter part of the second and into the third quarter of the year. The shipments are still heavy though the railroads appear to be a little slow in furnishing cars with which to load the product and are also short of locomotive power with which to move the product after it has been loaded. The production remains unchanged in this section, the furnaces in blast doing exceedingly well. The good weather continues and the work at the ore and coal mines is not being disturbed in the least. There is no accumulation of iron in this district, in fact much iron is being moved from the yards which accumulated last year and was sold to be delivered as requested.

The statement is reiterated in this district that some of the furnace companies are behind in their deliveries. Efforts are being made to send out as much iron as possible and catch up with the orders, but little or no progress is being made. Small lots of iron have sold again at $14.50 per ton, for No. 2, foundry.

The following quotations are mentioned: No. 1, foundry, $14.50 to $15; No. 2, foundry, $14 to $14.50; No. 3, foundry, $13.50 to $14; No. 4, foundry, $13; gray forge, $12.50 to $13; No. 1, soft, $15; No. 2, soft, $14 to $14.50.

Another immense casting machine is being placed at the furnace plant of the Tennessee Coal, Iron & Railroad Co., at Ensley. The new machine is being constructed and placed by Hyle & Patterson, of Columbus, Ohio. This will be the second machine of its kind in the south, the other having been constructed in Ensley a few years since by the Jones & Laughlin Steel Co., of Pittsburg, Pa.

The cast iron pipe plant of the American Cast Iron Pipe Co., North Birmingham, is nearing completion and within another two months it is expected that the making of pipe on a small scale can be started.

Supt. T. J. Kent, of the Bessemer rolling mills (T. C. I. & R. R. Co.), has resigned and will accept a position with the Dominion Iron & Steel Co., in Nova Scotia.

Rumors again prevail in this district as to a merger in which the Tennessee-Republic concern will take over the Sloss-

Sheffield Steel & Iron Co. and the Alabama Consolidated Coal & Iron Co.

There is still much activity at the steel plants in this district. The Ensley rail mills cannot produce the product quickly enough for those who have placed orders and representatives of southern railroads which are to relay old track or lay new road altogether are still paying visits to the Ensley institution and hurrying the delivery as much as possible on their orders.

Bessemer's board of trade is making efforts to locate a stove foundry. A proposition has been made to exempt the industry from taxes for a certain period and to donate a certain amount to the stock.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*, ROOM 1315, No. 150 NASSAU ST., February 13.

The entire metal market has been dull and weak. Prices have fallen in many cases and advices from abroad show a general slackness of demand. A late cable today reports a sharp decline in pig iron in the London market.

Pig Tin.—The market has suffered a sharp decline during the week. Small deliveries and large shipments from the straits combined to depress the market. Today's quotations follow: Spot and February, 36⅜c to 36¾c; March, 36.25 to 36.70; April, 36.25 to 36.65; London, £166 17s 6d and £165 10s; arrivals for the month to date, 1,693; afloat, 3,520.

Copper.—There has been an accumulation of refined copper in the hands of producers and some pressure to sell. At present the market is very dull. Today's closings follow: Lake, 17¾ to 18; electrolytic, 17⅝ to 17⅞; casting, 17½ to 17⅝; London's closing today: £78 and £76. Exports for the month to date, 5,114 tons.

Lead.—An easy tone has prevailed throughout the week with prices irregular. The close was dull. Today's closings, 5.65 to 5.75; St. Louis, 5.52½; London, £15 17s 6d.

Spelter.—The market for refined spelter has been very dull. Today's closing, 6.05 to 6.15; St. Louis, 5.29½; London, £26.

Antimony.—Prices have advanced in sympathy with developments abroad where government purchases have removed considerable holdings. Today's prices: Cookson's, 16c to 17c; Hallett's 15c to 1.½c; other brands, 14½c to 15c.

CHICAGO.

OFFICE OF *The Iron Trade Review*, 1164 Monadock Block, February 13.

Metals are quiet and prices are without appreciable change. Trading is confined to small tonnages for immediate requirements. We quote lake copper 18¼c to 18½c for carload lots, and 18¾c to 19c for less than carload lots. Casting copper is one-eighth of a cent lower than these prices. Pig lead, 5.65c, delivered, in 50-ton lots, desilverized, and 5.90c to 6c in smaller quantities. Pig tin, 37c to 39c, according to quantity. Spelter is firm at 6.60c to 6.90c for carload lots, and 7⅛c to 8¼c for smaller lots. Antimony is without change at 14c to 14¼c for Hallett's, and 14½c to 16½c for Cookson's, the latter still being scarce. Nickel is 50c to 65c, according to amount and delivery.

Little activity is noted in old metals and prices have declined to lower levels. We quote copper wire, 15¼c per pound; heavy copper, 15⅛c; copper bottoms, 14½c; copper clips, 15¼c; red brass, 14¼c; yellow brass, heavy, 10¾c; yellow brass borings, 9½c; red brass borings, 12c; light brass, 7¾c; pipe lead, 4¾c; tea lead, 4c; zinc, 4¼c; tin foil, 27¾c; pewter, No. 1, 22¾c.

LARGE PROFITS

Made by Zenith Furnace.—Oliver Company Buying Timber Land.

Duluth, Minn., Feb. 10.—The Zenith furnace company of this city, has made a profit of more than $200,000 on its operations in 1905, on an investment of about $1,250,000. It will pay no dividends yet, but is accumulating a large working capital. The company intends to add materially to its plant before very long.

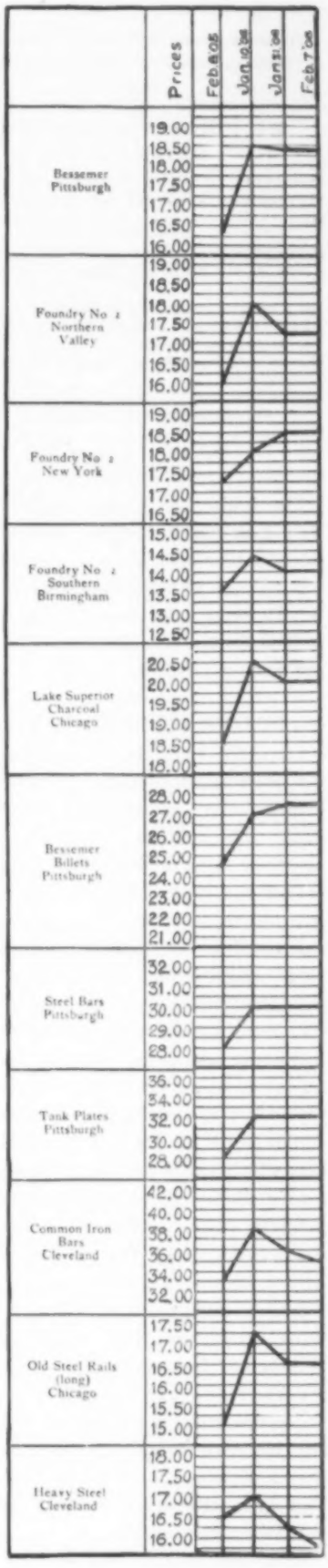
The Oliver company is buying timber lands, and has recently secured 32,000 acres on the Gogebic range, giving it about 200,000,000 feet of standing timber in that section.

Marcus L. Fay, who has had more or less success in exploring on the Mesabi range, has subleased the old Mallman exploration on the east end of the range and expects to build a railway in there this season and take out the ore. It is a little mine, but has good ore, near the surface. It lies three miles beyond the Mayas, to which a road is now being built from Mesaba station.

The old Wacouta exploration east of Mountain Iron is to be opened this season as a milling mine. A shaft is now down 60 feet and will be sunk to 200. It will drain the ore before mining begins. A complete exploration of the ore deposit will be made before shipping takes place.

General manager Chas. T. Fairbairn, of the Republic mines, will take up his residence at Duluth, as soon as he can find a house. Mr. C. T. Kruse, superintendent at the Lake Angeline mine, will probably be Mr. Fairbairn's successor at the Lincoln.

PRICE CHART.



THE IRON TRADE REVIEW

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February 15, 1906.

The index for volume XXXVIII of THE IRON TRADE REVIEW, covering the calendar year 1905, has been printed and will be sent to subscribers who ask for it. To those who were on the index mailing list last year it will be sent without waiting for directions.

STRIKE DEVELOPMENTS.

Since the strike was inaugurated by the printers in Cleveland, several decisions have been rendered which indicate the growing tendency of the courts to take a firm stand in favor of law and order. Recently a petition was filed by the employing printers in the court of common pleas, alleging that numerous acts of violence had been committed by the strikers, and that many threats had been made. An injunction restraining the strikers from all forms of violence and intimidation was asked for and granted, the court setting forth clearly and in detail the acts which would not be tolerated.

Last Friday a printer employed on publications of the Penton Publishing Co. was placed on trial on the charge of carrying concealed weapons. The defendant admitted that he carried concealed weapons, but testified that threats had been made against him in the vilest language and that he believed he was justified in carrying weapons for his own defense. After hearing the testimony of the defendant and two other witnesses, the court rendered the following decision:

"The law in this case is clear that upon trial for indictment for carrying concealed weapons the jury shall acquit the defendant if it shall be made to appear that he was at the time engaged in any lawful calling, business or employment, and that the circumstances in which he was placed were such as to justify a prudent man to carry a weapon in defense of his person, property or family. I think I would have been justified in doing the same thing if I were placed in the position of the defendant. The defendant is, therefore, discharged."

This decision is important as showing that in times of danger incident to a strike, any one who has reason to believe that violence will be committed upon him has a perfect right to carry weapons.

Under the present conditions it is not the courts that are to be feared by those who are making an effort to establish just relations between employer and employe. The real enemies of the cause are its pretended friends, who do not have the courage to stand up for what they profess to be their convictions. There are, as *The American Machinist* stated in its last issue, some papers which "rant against the encroachments of labor in the field they represent and thus cater to the employer of labor—yet, were among the first to lie down and let the printers' union walk all over them in their own fight." We also agree with the same article in our estimated contemporary, in which it declares that "this is no time for any individual, or any publication, to straddle and wabble and dodge the issue." The present strike of the printers, so unfortunate in many respects, is serving a useful purpose in showing who are the real fighters for the open shop and who are the cowardly traitors.

DISTRIBUTION OF PIG IRON PRODUCTION.

An examination of the proportionate pig iron production by states and districts in the United States shows the increasing use in the past two years of Lake Superior ores. During the period from 1890 to 1900, there was a decided increase in production in the regions tributary to the Lake Superior ore ranges. Then there was a period from 1902 to 1903 when the opposite tendency was noticeable. At that time the districts tributary to the Lake Superior ore region, almost without exception, showed a decreased proportionate production. The opinion was then expressed that this decrease indicated the importance of encouraging the consumption of Lake Superior ore by selling it at a lower price. Taking old range Bessemer as a base, the price in 1902 was $4.25 and in 1903, $4.50 In 1904 the price was decreased to $3.25 and in the following year advanced to $3.75. The reduced price has been followed by a larger proportionate use of Lake Superior iron ores, although the increased use was not, of course, due entirely to the change of price. With so rapid an increase in the total production it is impossible to observe whether certain states and districts are advancing or falling behind in the procession without a recourse to figures showing the proportion which each furnishes from time to time to the total. Such comparisons have heretofore been made in these columns, but none later than that which included the 1903 figures. In the accompanying table is given the percentage furnished by each state and district for 1890 and 1900, and also for the last four consecutive years.

A study of these percentages discloses some very interesting shifts in the relative importance of different districts, and also shows some general drifts which should be of interest to those contemplating investment.

Before studying details it is worth noting that the state of Pennsylvania has been contributing almost half of the country's total pig iron production, while Allegheny county has been producing more pig iron than any other state or district. Ohio ranks next, followed at a distance by Illinois, Alabama closely following, pursued only, and that but lately, by New York, in which state the completion of the furnaces of the Lackawanna Steel Co. and the Buffalo & Susquehanna Co. has been an important factor in increasing production.

From 1890 to 1905, of the states and districts enumerated in the table, only ten showed an increase; nevertheless these made more than two-thirds of the total in 1905. Evidently

the strong are growing stronger and the weak are growing weaker. In every case, except for the detached states of Missouri, Colorado, Oregon, and Washington, the districts which increased are districts which are tributary to the Lake Superior ore region. Practically all of these districts also showed an increase from 1903 to 1905.

In seeking to compare 1905 with a recent year, in addition to the comparison with 1890, the year 1903 is advisedly taken instead of 1904, for a particular reason. The year 1904 was one of a slump in production; it showed a decrease of a million and a half tons over the previous year, and was the first year since 1896 which did not break all previous records. In the year 1904 certain districts, particularly the states of West Virginia and Illinois, Allegheny county in Pennsylvania and the lake and Mahoning valley districts of Ohio, largely increased their percentages over 1903. They did this because they were able to continue producing at approximately the 1903 rate, while other districts bore approximately the whole burden of the decline. It would be too much to expect that in the enormous gain in the total from 1904 to 1905, a gain which amounted to 40 per cent, these districts could maintain their increased percentages. Allegheny county, for instance, advanced from 23.4 per cent in 1903 to 26.6 per cent in 1904, falling back to 23.5 per cent in 1905, although its tonnage from 1904 to 1905 increased by more than 23 per cent. The state of New Jersey represents the only district of consequence, not directly tributary to the Lake Superior region, which increased its contribution from 1903 to 1904.

Eighty per cent of the total production in 1905 was furnished by the four states New York, Pennsylvania, Ohio and Illinois, bordering the great lakes on the south. Indiana, never an important producer of pig iron, disappeared entirely after 1893, but for no other reason than because of the little portion of Lake Michigan which the state touches is to be restored to the ranks on the building of the steel corporation's new western plant. Alabama furnished 7 per cent of the total. The remaining 13 per cent was furnished by nearly two dozen distinct producing districts.

One can trace some very instructive histories in the 15 years covered by this percentage table. In 1890 the far-away state of Maine was a very modest producer of pig iron, but has not figured in recent years. New York in 1890 made 3.6 per cent of the country's total, but in 1905 made 5.2 per cent. In 1890 the state had 39 blast furnaces which had not been absolutely abandoned, and remains of 24 which at one time had been active. Few of these 63 furnaces had used Lake Superior ores at all, and none had depended upon them exclusively or even largely. Now the great bulk of New York's very much larger production is made on the lake shore exclusively of Lake Superior ores.

There was formerly a district in Pennsylvania known as the upper Susquehanna valley. It has disappeared from the statistics entirely, the last important operation to be discontinued being that of the Lackawanna Iron & Steel Co., which moved to Buffalo. In 1890 the upper Susquehanna valley made 185,000 tons, or 2 per cent of the country's total. Eastern Pennsylvania has rapidly lost ground. The four valleys, Lehigh, Schuylkill, Susquehanna and Juniata, made in 1890 23.4 per cent of the country's total pig iron; in 1905 they made but 8.9 per cent. Their actual tonnage decreased but slightly, being still about 2,000,000 tons, but whereas they formerly depended almost exclusively on local ores they now use imported and Lake Superior ores very largely.

The furnaces classed as miscellaneous in Pennsylvania have given a good account of themselves. In this category are included the operations at Johnstown and Donora of steel interests,

Proportionate Pig Iron Production in United States by Districts.
In percent:

	1890	1900	1902	1903	1904	1905
Maine	0.0	...	...	...	...	...
Massachusetts	0.1	0.0	0.0	0.0	...	0.1
Connecticut	0.2	0.1	0.1	0.1	0.1	...
New York	3.6	2.1	2.3	3.1	3.6	5.2
New Jersey	1.7	1.2	1.1	1.2	1.6	1.4
Pennsylvania	(48.0)	(46.2)	(45.5)	(45.6)	(46.3)	(46.0)
Lehigh Valley	7.9	4.0	2.9	3.6	2.8	2.7
Schuylkill Valley	5.9	3.2	2.9	3.1	2.5	2.4
Upper Susquehanna V'y	2.0	1.0	0.0	...	...	...
Lower Susquehanna V'y	5.5	3.9	3.0	2.8	2.4	2.9
Juniata Valley	2.1	0.9	1.1	1.3	0.7	0.9
Shenango Valley	6.5	5.8	7.0	6.3	6.1	7.8
Allegheny County	14.5	22.6	23.9	23.4	26.6	23.5
Miscellaneous Bitum	3.4	4.7	4.7	5.1	5.2	5.8
Charcoal	0.2	0.0	0.0	0.0	0.0	0.0
Maryland	1.6	2.1	1.7	1.8	1.8	1.4
Virginia	3.2	3.6	3.0	3.0	1.9	2.2
North Carolina and Georgia	0.3	0.2	0.2	0.4	0.5	0.2
Alabama	8.9	8.6	8.3	8.7	8.8	7.0
Texas	0.1	0.1	0.0	0.1	...	...
West Virginia	1.4	1.2	1.0	1.1	1.6	1.3
Kentucky	0.5	0.5	0.6	0.6	0.2	0.3
Tennessee	2.9	2.6	2.2	2.3	1.8	1.6
Ohio	(13.5)	(17.9)	(20.4)	(18.2)	(18.1)	(19.9)
Mahoning Valley	5.4	7.3	8.1	7.0	7.4	7.5
Hocking Valley	0.9	0.4	0.2	0.1	0.1	...
Lake Counties	...	3.6	4.8	4.6	4.9	5.7
Miscellaneous Bituminous	6.0	4.8	5.4	4.6	4.2	5.2
Hanging Rock Bituminous	1.0	1.8	1.8	1.8	1.5	1.5
Hanging Rock Charcoal	0.3	0.1	0.1	0.1	...	0.0
Indiana	0.2	...	...	...	...	...
Illinois	7.6	9.9	9.7	9.4	10.0	8.8
Michigan	2.5	1.2	0.9	1.3	1.4	1.3
Wisconsin	2.4	1.3	1.5	1.6	1.3	1.5
Missouri, Colorado, Oregon, Wash'ton	1.3	1.1	1.5	1.5	1.0	1.8
	100.0	100.0	100.0	100.0	100.0	100.0

TOTALS IN GROSS TONS.

1890	9,202,704
1900	13,789,242
1902	17,821,307
1903	18,009,252
1905	22,992,380

Note:—The totals of Pennsylvania and Ohio are included in parentheses, as they are simply a summation of the percentages in their respective districts. A dotted line, as in the case of Maine, represents no production; the statement of the percentage being 0.0 indicates that there was a tonnage of less than one-twentieth of one per cent.

Massachusetts in table includes Connecticut, North Carolina and Georgia in clude Texas. In ake counties, one Hocking valley furnace is included. Wisconsin includes Minnesota.

and various merchant furnaces in western Pennsylvania but not in Allegheny county or the Shenango valley.

The "valleys," the Shenango in Pennsylvania and the Mahoning in Ohio, have done well, making 11.9 per cent in 1890 and 15.3 per cent in 1905 of the country's total. To do this they more than tripled their tonnage, the increase being 221 per cent.

Alabama has been somewhat of a disappointment. In 1890 the most confident prophecies were made of what Alabama would do to other iron producing regions. In 1890 Alabama made 8.9 per cent of the country's total, its best proportion to that time; 1893 and 1896 were the only years in which the state furnished as much as 10 per cent of the total, while the contribution in 1905 was but 7.0 per cent, by far the poorest of recent years. The prolonged strike of coal miners has curtailed production in Alabama and Tennessee.

The shifting of production of pig iron from one locality to another is not as expensive or wasteful as might be imagined. A blast furnace is a very costly affair, but the value of its output is also very large. It requires considerably less than a year of fair prices to turn out pig iron worth more than the total investment. Removal does not involve an abandonment of so very large a part of the investment. A removal suddenly determined upon would still save much costly machinery, not only at the furnace proper, but in the adjunct apparatus for the handling of material. A removal after several years of foreknowledge would involve comparatively little loss. Furnaces must be relined and rebuilt; the apparatus must be replaced at relatively frequent intervals. A migration of a large part of the pig iron producing industry could be accomplished in a decade or two with no very great loss. The removal of the plant by which pig iron is utilized would be a more important matter, but it does not necessarily follow that the centers of consumption must also move.

According to the *Coal Trade Journal*, of the 280,000,000 net tons of soft coal produced in 1904, no less than 69,611,582 tons were mined by machine, and each machine is credited with an out-turn of 10,258 tons for that year.

REDUCED EARNINGS

Of the Pittsburg Coal Co. Attributed to Cutting of Prices and Car Shortage.

The annual report of the Pittsburg Coal Co., Pittsburg, for the fiscal year ending Dec. 31 showed net profits, after deducting all expenses, of $3,255,358 as compared with $4,261,511 in 1904, $7,787,094 in 1903 and $5,753,913 in 1902. From this is deducted for depreciation, additions, etc., $1,423,346, leaving net earnings of $1,832,012. Dividends on preferred stock and interest totaled $1,550,360, leaving undivided profits of $281,652 which was appropriated for working capital. The assets of the company show a decided increase over those of a year ago. The production of coal in tons was as follows: Pittsburg district, 12,926,954; Hocking district, 1,371,620; coke district 355,873. This was slightly in excess of 1904, but less than in 1903 and 1902. Net earnings from coke operations were $232,784. A portion of the 8,000 acres of coking coal lands of the company was developed during the year and 204 ovens were added. The stockholders approved plans of the directors for the sale of 262 acres of its coking coal lands at $1,222 per acre. The company's interest in the Western Coal & Dock Co. of Waukegan, Wis., has also been sold to the Erie Railroad and the Whitnall Coal Co. of Milwaukee has purchased the Pittsburg company's two third interest. With the proceeds of these sales it is proposed to erect a 500-oven coking plant in the vicinity of the plants operated by the Colonial Coal & Coke Co., a constituent, to open an additional mine and to make other improvements. The cutting of coal prices early in the year and the later car shortage are given as reasons for the reduced earnings.

At the stockholders' meeting the old board was reelected with the exception of A. M. Neeper, T. C. Wales, L. R. Doty and F. M. Wallace, who were succeeded by A. Dempster, C. Donnolley, D. L. Gillispie and J. Dennison Lloyd. The directory board chose M. H. Taylor, president, and made F. L. Robbins, chairman of the board where he will continue as the active head of the new Pittsburg Coal Co., of Columbus, O., and of the dock company. R. A. Hammill, formerly of the Marine Coal Co., was chosen general sales agent to succeed O. A. Blackburn who becomes treasurer of the Sharon Sheet Steel Co.

The Cleveland Cliffs Iron Co., on March 1 will occupy new offices in the Rockefeller Bldg., Cleveland, where practically all the eleventh floor is being fitted up for its needs.

WARWICK IRON & STEEL CO.'S REPORT.

The Warwick Iron & Steel Co., Pottstown, Pa., according to the annual report for the year ending Dec. 31, 1905, earned slightly more than 10 per cent on the capital stock, but no dividend was declared, the directors deeming it advisable first to accumulate a more ample working capital. The total pig iron product for 1905 was 205,788 tons, 80,000 tons in excess of 1904, and 30,000 tons more than in any previous year. The melting away of the brick lining put furnace No. 1 out of blast from June 16 to the first of August, but No. 2 furnace was operated continuously, with an aggregate idleness of only seven days. A bridge is to be erected connecting the present slag pile of the furnace with a large farm owned by the company on the opposite side of the river, which will be made available for sale as manufacturing sites. The net earnings, after deducting all charges, are $147,672, practically the same as in 1903 and 1900 and far in excess of any other years. The old directory board will continue.

AMERICAN CAN CO.'S REPORT.

Owing to a change in the fiscal year from March 31 to Dec. 31, the annual report of the American Can Co., recently made public, covers operations for only nine months. For this period it shows net profits of $2,311,417, practically as much as those of the twelve months of the fiscal year ending March 31, 1904 and $585,000 less than those of the 1905 fiscal year. The plants, etc., are valued at $74,854,299; improvement and construction charges are given as $3,376,043; and the total assets are placed at $87,750,506. The surplus has increased from $3,281,844 in March, 1905, to $4,285,389.

"Since the last report," stated President Graham, "We have expended in extension $565,881.87, the principal items of which are: office and factory site and partial construction of building, Fourteenth street, New York; factory site and building, Lubec, Me.; factory sites, New Orleans, La., Savannah, Ga., and Chicago, Ill. The Fourteenth street property will be occupied on May 1 as a manufacturing plant, taking over the equipment now in rented property on Jane street, and as the home and general offices. The Lubec factory is practically completed and will be in operation within a few weeks. The New Orleans and Savannah sites will be built on at once and the Chicago site within the year."

The plant of the East Peoria Steel & Tool Co., was sold a few days ago to J. A. Engel & Co., manufacturers of agricultural implements. P. E. Herschel had charge of the disposition of the plant.

COMPETITION BLOCKED.

British Iron Bar Association Takes In Rival Concerns.—Will Advance Prices.

(Special Correspondence.)

Birmingham, Eng., Feb. 1.—Last Thursday's meeting of the iron trade was signalized by a most important new departure. Inter-district competition has been the one obstacle to the realization of the benefit of iron trade prosperity, and the Unmarked Bar Association, after carefully thinking the matter over, decided to take Lancashire and North Staffordshire into its counsels. Accordingly at the meeting on Thursday, which was presided over by Mr. Ebenezer Parkes, M. P., representatives were present from Lancashire and North Staffordshire, including a member of the firm of Messrs. Robert Heath & Sons, of Stoke-on-Trent. After discussion, it was found that combination was perfectly feasible, and it was decided to sell in all the districts at £7 5s 0d. This is the present minimum, but this figure is only adhered to for immediate specifications; 5s more is asked for future contracts. There would have been an immediate advance, but for the desirability of awaiting the return in regard to selling prices and wages which is due in a few days. Immediately this is issued, prices will be advanced. The amount of the advance is at present in doubt, but there is a general expectation that wages will rise 5 per cent. The return of the northern trade has just been made, which gives the man 2½ per cent, and it may be taken for granted that this will represent the amount of the Midland advance. In that event, a 5s advance on unmarked iron, with 10s' as an outside figure seems to be the probable change. The selling price in the north for November and December was £6 3s 6.53d per ton as against £6 0s 0.34d per ton for the previous two months. The advance, though small, is sufficient to show that the influence of old contracts is now being overcome.

Some little concern has been caused by the reappearance of Belgian steel sheets as competitors with the British article. In one case the Belgians managed to undersell the local house materially. The effect is likely to be in the direction of arresting further local advances for the present. Some few billets have lately been coming from Germany, but the makers in the Fatherland have now decided that for the next half year they will require to consume all their own make. In the meantime, the rebuilding of puddling furnaces goes on in the Black country district. For the present, there is a slight slackening in demand for most sorts, but this light change causes no particular anxiety, as all the works have orders for months ahead.

Pig iron maintains great firmness, while the flow of iron into the Middlesboro stores has been arrested somewhat by the stoppage of five of Messrs. Bolckow Vaughans' furnaces for repairs. They will probably re-start next week.

A well known young iron master, Mr. Percy Herbert Corbett, of the Perseverance Iron Works, Shrewsbury, has been the victim of an extraordinary outrage. He was making a tour of inspection of the works on Sunday evening last, when he was attacked by some men in an isolated part of the works, being seized from behind, nearly strangling him, and then struck him with a hammer. As he lay unconscious, his watch and chain were carried off by the thieves.

CHICAGO PNEUMATIC TOOL CO.'S REPORT.

The annual report of the Chicago Pneumatic Tool Co., for the year ending Dec. 31, 1905, shows net earnings of $852,612, the heaviest since 1902, when $897,059 was earned. The surplus has increased about 75 per cent. The totals of the various items compare as follows:

	1905	1904
Net	$852,612	$470,579
Bond Int.*	165,000	115,000
Balance	$687,612	$355,579
Dividends	214,551	.....
Balance	$443,061	$355,579
Sinking fund	.....	50,000
Balance	$443,061	$305,579
Depreciation	127,926	85,888
Balance	$315,135	$219,691
Leg. exp., etc.	.....	24,367
Surplus	$315,135	$195,324
Prev. surp.	221,157	113,706
Total surp.	$536,292	$309,030
Cost of bldg.	.....	55,000
P. & L. surp.	$536,292	$254,036

*Includes sinking fund.

Iron and Steel Institute.—The Iron and Steel Institute, through the secretary, Bennett H. Brough, of 28 Victoria street, S. W., London, announces that the annual general meeting will be held at the Institution of Civil Engineering, Thursday and Friday, May 10 and 11. Applications from candidates for membership must be received before March 30 to be included in the voting list. In place of the usual annual meeting, a joint meeting of the American Institute of Mining Engineers and of the Iron and Steel Institute will be held in London, July 23-29. The Lord Mayor of London will act as chairman of the reception committee and the annual dinner will be held at the Hotel Cecil, July 27. Members of the institute are invited to participate in the sixth International Congress of Applied Chemistry at Rome, April 25 to May 3. The institute council will shortly proceed to award the Carnegie research scholarships, for which candidates must apply before Feb. 28.

NEW RAILWAY EQUIPMENT.

The largest order for railway equipment placed during the past week was secured by the South Baltimore Street Car & Foundry Co., which will make 2,000 steel hopper cars for the Fairmont Coal Co. and 1,000 for the Somerset Coal Co. The Midland Valley has ordered 300 gondolas from F. M. Hicks & Co., the Fort Smith & Western 100 additional box cars from the Mt. Vernon Car Mfg. Co., the Union Railroad 500 hopper cars from the Pressed Steel Car Co., the Duluth, Rainy Lake & Winnipeg 75 additional logging cars from the Russel Wheel & Foundry Co. and the Guyan Valley Fuel Co. 100 steel underframe coal cars from the South Baltimore Steel Car & Foundry Co.

Among those roads reported as in the market are the following: Colorado & Southern, 300 coal cars; Chicago Great Western, 1,000 stock and box cars; Central of Georgia, 400 flats, 1,000 coal and 1,000 box cars; Ingoldsby Automatic Car Co., 300 to 1,000 dump cars; Hocking Valley, 1,000 box cars; and Mexican Central, 1,150 box cars, 160 stock cars and 75 flat cars.

The Virginia & Carolina Coast has ordered four mogul and three American type locomotives from the American Locomotive Co., which is also to build 75 locomotives for the Norfolk & Western. The Lehigh & Hudson River is in the market for six new locomotives.

The Pennsylvania Railroad is building at its Altoona shops 100 box cars for the transportation of automobiles. They will have 12-foot side door openings.

Lost Energy.—Thomas A. Edison recently told the New York *Times* that what he considered the next most vital discovery in the scientific field would be "the control of energy stored in coal, directly and without waste. It is not only possible but probable of discovery. Some day soon it will be made. Ninety per cent of the energy stored in coal is now lost It goes off in heat from the chimneys, and is especially wasted in the process of converting water into steam. If, therefore, a means can be devised by which this great waste can be obviated it will naturally revolutionize and vastly cheapen the production of power."

Chiefly through the agency of the American Mining Congress, a systematic attempt is being made to secure 1,500,000 names to a petition to be presented to Congress, urging the passage of the bill now pending, providing for the creation of a "Department of Mines and Mining," on the same plan as the Department of Agriculture is now conducted.

HEINZE PROPERTIES

In Montana Copper Field Turned Over to Thomas F. Cole.—Long War Ends.

The mining properties controlled by F. Augustus Heinze in Silver Bow county, Mont., have been turned over to Arthur C. Carson, as agent for Thomas F. Cole, of Duluth, who will transfer these holdings to a new company now forming in which the Amalgamated Copper Co., the North Butte Mining Co., and the United Copper Co. interests will be represented. This marks the close of the Montana copper war which has been fiercely waged for a decade between the Amalgamated Copper Co. and Mr. Heinze and the United Copper Co. It is estimated that the value of the ore bodies affected is in the neighborhood of $50,000,-

THOS. F. COLE.

000. The result of the settlement will be the reopening of a number of mines which have been shut down because of litigation for a number of years. It is understood that Mr. Heinze retains only slight holdings in the La France Copper Co. which controls the lease of the Lexington group of mines.

Not Looking for Work.

Duluth, Minn., Feb. 12.—President T. F. Cole, of the Oliver Iron Mining Co. has gone to New York to attend meetings of companies in which he is interested. There have been all sorts of rumors as to Mr. Cole's future, that he would leave the Oliver Company to take charge of the Amalgamated Copper Co., that certain consolidations in copper were to largely increase the importance of Amalgamated, and so on. Mr. Cole has never dignified these rumors by denial.

"What is the use," he says, "if I begin denials, the rumor factories will work overtime, so fast that I shall not be able to keep up."

"What I am trying to do," continued this most widely discussed man, "is to get less work, not more. The Oliver Iron Mining Co. is the largest mining company in the world, but its operations are systematized, and we have the best men to be found as leaders in its various departments and fields of activity. I'm not looking for new jobs."

"In the matter of settling the recent copper war in Montana, I've been glad to help in any way possible, and am looking forward to the greatest developments in copper, not only in our own mines in Arizona, Montana and Lake Superior, but in the general copper situation.

WESTERN BAR IRON ASSOCIATION.

The Western Bar Iron Association, comprising the bar iron mills at Cleveland, Detroit, St. Louis, Madison, Ill., Vincennes, Ind., New Albany, Ill., and Terra Haute, Ind., was organized at Chicago last week, and James H. Nutt, formerly labor commissioner of the Republic Iron & Steel Co., with headquarters at Youngstown, was elected secretary and treasurer. The organization was formed primarily to deal with the labor question, and Mr. Nutt's experience and friendly relations with the Amalgamated Association will be invaluable. As the organization has held but one meeting, the plans have by no means been perfected, and the full scope of the association has not been determined.

The officers elected are as follows: president, Sim C. Leonard of Detroit; vice president, George M. Clark, of New Albany, Ind.; secretary and treasurer, James H. Nutt, of Youngstown; executive committee, S. P. Llewellyn, of East Chicago, R. M. Myers of Terre Haute, Ind., and Sim C. Leonard.

Consulting Engineers.—Frazier, Fox & Spencer, with offices in the Rockefeller Bldg., Cleveland, have been appointed consulting engineers in connection with the construction of the 20-story Union National Bank Bldg., corner of Fourth avenue and Wood street, Pittsburg, and also for the new 15-story building of the Commonwealth Trust Co., immediately adjoining. The firm is also in charge of the engineering work of the new Times Recorder Bldg., at Zanesville, O. The work of the firm upon these three buildings includes the steel frame work, heating, lighting, power, plumbing and other mechanical equipment.

The National-Acme Mfg. Co., Cleveland, announces that its Chicago office is shortly to occupy quarters, warehouse facilities included, in the Edgcomb Bldg., Clinton and West Washington streets with office at 56 W. Washington street.

LARGE INCREASE

Will be Made in Shipments from Menominee Range this Year.

Iron Mountain, Mich., Feb. 12.—There is much activity in this region, and the old reliable Menominee range will doubtless show a great increase in tonnage and in number of mines this year. Railway facilities will be improved by the building of a 15-mile branch of the Milwaukee road to the Iron River district.

At Crystal Falls all mines are preparing for unusually large shipments, and old properties are being unwatered. This job has just been completed at Armenia, where it took three weeks to do what has heretofore required two or three times as long. The new hoist is being set at Dunn, and at Fogerty Pickands, Mather & Co. are drilling with good results. Great Western and Tobin will make a large product for the year, while the Oliver company's group near the town will be actively developed and mined.

The Chapin mine aid fund—for employees of that property alone—spent last year $4,120 and ends the year with a comfortable balance of $13,768. This fund is made up of fifty cents per month by mine employees, and besides being a life, accident and sick insurance gives the men a great many comforts and conveniences.

Chapin's 2,000-foot steel shaft is nearly on bottom, and will be ready to connect up in two or three weeks. It is vertical 12 x 24 feet, with three compartments, one of which is 10 x 12 feet for the pump, and in which the famous old Cornish pump of "D" Chapin will be reset. This pump, including rods—they are 6-inch solid steel round bars 2,000 feet long—weighs 900 tons and will handle 3,000 gallons per minute. The shaft has been connected with Hamilton workings at several levels, and will be a producer through two big skipways. It is steel lined throughout and will have a steel headframe.

The Millie, which is a part of the Pewabic ore deposit, will probably mine up to 100,000 tons this year.

Oglebay, Norton & Co. are sinking on the Selden option, at Steinbaugh, and are getting mixed ore and rock. The shaft is looking very well.

Coke Plant Completed.—The Perry Coke Co., Pittsburg, has just completed its plant of 30 ovens near Star Junction on the Elwell Run branch of the P. & L. E. railroad, and this week began the shipment of about 75 tons of coke per day. This analyzes 0.74 per cent of sulphur, assuring a high grade of foundry and furnace coke.

MILNE IS ADVANCED.

Takes Position of General Manager of Allis-Chalmers-Bullock, Ltd., at Montreal.

James A. Milne, for a number of years comptroller of the Allis-Chalmers Co., Milwaukee, has accepted the position of general manager of Allis-Chalmers-Bullock, Limited, Montreal, Canada, and will assume charge on or before May 1, 1906.

Mr. Milne is a native of Canada, having been born at Waterdown, Ontario, in 1872. After completing a public school and collegiate course, he began his business career at Toronto in 1888. During the ensuing four years he was with Robert Simpson & Company and Wyld, Grassett & Darling, of that

JAMES A. MILNE.

place; but in 1892 he removed to Chicago, entering the employ of Carson, Pirie, Scott & Co. Subsequently he worked for Reid-Murdock & Co., and the Chicago Packing & Provision Co.—for the latter as chief accountant. Then he became associated with Jones, Caesar & Co., chartered accountants of Chicago and New York, and it was this connection which brought him into touch with the Allis-Chalmers Co. In August, 1901, he entered its employ, as chief cost clerk, and one month later was appointed acting comptroller, being formally elected to that position at the meeting of the board of directors, in May, 1902. Since the early part of last autumn, Mr. Milne has been one of the directors of Allis-Chalmers-Bullock, Limited, and the fact that he still retains Canadian citizenship, and is deeply attached to his early associations, has been an important factor in influencing him to heed a recall to the Dominion.

L. F. Bower, manager of the electrical works of the Allis-Chalmers Co. at Cincinnati, will succeed Mr. Milne as comptroller. He graduated from Wesleyan University in 1879 and was for a time secretary and treasurer of the Dickson Mfg. Co., Scranton, Pa., which was absorbed by the Allis-Chalmers Co. in 1901. He was transferred to the electrical department at Cincinnati less than a year ago.

IRON AT $10 A TON.

Canadian Experiments Indicate This is Possible.—Final Tariff Revision Hearings.

(Special Correspondence.)

Toronto, Can., Feb. 12.—The mines branch of the Department of the Interior at Ottawa has received a report of the experiments in electric smelting by Dr. Herault, the French scientist at Sault Ste. Marie to the effect that the result shows that pig iron can be produced by the electric process from red hematite ore at a cost of less than $10 a ton. The cost of production by the ordinary process, as stated in evidence before the tariff commission last week, is between $14 and $15 per ton.

Great activity continues to prevail in all branches of the iron and steel industry. The Lake Superior Corporation, of Sault Ste. Marie, produced more steel rails in January than any previous month, the output being 14,000 tons, all for the Canadian Pacific Railway. It has contracts on hand for 100,000 tons of steel rails for the Canadian Pacific, Michigan Central, Canadian Northern and other lines. Since September, 1904, the company has delivered $5,000,000 worth of rails to Canadian railways. At the Dominion Iron & Steel Works, Sydney, N. S., the output in all departments was heavy during January.

The Dominion Tariff Commission concluded its investigation on Feb. 8, after a three-days' session at Ottawa, during which it heard a large number of deputations representing all classes of manufacturers. Its proceedings have lasted over five months during which it traveled 25,000 miles. Edward D. Metcalfe, representing the International Harvester Co., of Hamilton, opposed any increase in the present rate of duty on agricultural implements and quoted figures showing that since his company had begun business in Canada the imports of farm implements had decreased. "Implements," he said, "should be put on the free list or the duty reduced to 5 per cent." Robert Hobson, representing the Hamilton Steel & Iron Co., wanted a duty of $3 per ton and a bounty of $2.50 per ton on pig iron. On steel billets he asked a duty of $4 and on steel ingots $2 per ton. The most important feature of the sitting was the presentation by C. C. Ballentyne, of Montreal, president of the Canadian Manufacturers' Association of a voluminous memorial reviewing the whole situation and presenting the views of the association in favor of a general increase in duties. Its position was summed up as follows: "We desire to make in Canada everything which can resonably be manufactured here and to buy our surplus requirements, so far as it is reasonable to do so, from British sources. To this end we desire a higher tariff than we now have against all foreign countries. While we do not favor any discrimination against the United States, as compared with other foreign countries, yet the proximity of the great republic, with its gigantic combinations of capital, its keen business men, and its constant surplus production, subject the manufacturers of Canada to competition, which, unless properly safeguarded, means certain ruin." The memorial indorsed the proposed policy of a maximum, a minimum and a preferential tariff, so long as it encouraged the making of everything possible at home, but stated that if such a policy should result in extending the minimum tariff to the United States, the association was absolutely opposed to it.

Hon. Mr. Fielding, Finance Minister, brought up the matter of the British preference and asked Mr. Ballentyne whether the association wanted the duties on British goods increased. Mr. Ballentyne endeavored to dodge the issue and it was only after the direct question had been repeated three times, that he admitted that such was the desire of the association. "In some cases," he said, "it is absolutely necessary. We know that some manufacturers in this country are suffering from the preference." He explained that where such was the case they would like the tariff raised to a competitive basis. The significance of this admission will be understood when it is recalled that the association has been doing all in its power to strengthen the hands of Mr. Chamberlain by passing resolutions in favor of his imperial preference policy, leading the British people to suppose that Canadians are willing to share their home market with the English manufacturer in return for a preference on Canadian wheat. What they really are willing to concede is a nominal preference, with the general tariff raised sufficiently high to prevent its being really effective. Obviously an "imperial preference" of this sort is hardly a sufficient incentive to induce John Bull to abandon his traditional free trade policy, and hereafter Canadian "imperial preference" utterances are likely to be discounted in the British political market at their true value.

PERSONALS.

W. T. Graham, president of the American Can Co. has left for a three months' tour in Europe.

L. Ferriss, northwestern manager of Coxe Bros. & Co., Inc., Feb. 1 became manager of sales of the Zenith Furnace Co., Duluth, Minn.

Charles H. Tilghman has been elected a director of the Georges Creek Coal & Iron Co., taking the place of Dr. W. J. Moale, deceased.

J. I. Van Vleit has been elected a member of the directory board of the Duluth & Mesaba Iron Co., Duluth, succeeding J. B. Arnold, resigned.

W. J. Verity, president of the Verity Plow Co., Branford, Ont., is on his way to Australia and the Fiji islands in the interests of the company.

W. B. Leads has resigned as a director of the American Can Co. R. H. Ismon, secretary and assistant treasurer of the company, succeeds him as director.

Samuel McDonald has resigned his position with the Tennessee Coal, Iron & Railroad Co. to conduct a fruit farm in California which he has recently purchased.

O. G. Ferguson has been chosen superintendent of transportation of the Monongahela Connecting Railroad, of Pittsburg, operated by the Jones & Laughlin Steel Co.

W. H. Hugus has retired as superintendent of the Davidson plant of the H. C. Frick Coke Co., in the Connellsville region. He has been succeeded by R. C. Beerbour.

J. F. Deimling, recently appointed chief engineer of the Pere Marquette, of which he had been division engineer of maintenance of way, assumed his new duties Feb. 1, with headquarters in Detroit.

A. W. Johnson, for the past twelve years general superintendent of the New York, Chicago & St. Louis, Feb. 1 assumed the position of general manager of that road, with headquarters at Cleveland.

T. F. Salter has accepted the position of chief engineer of the North Penn Iron Works, Philadelphia, Pa. For the past three years Mr. Salter has been chief mechanical draftsman for the C. W. Hunt Co., of New York.

A. Dollenmayer has been elected vice president of the Globe Iron Works Co., Menominee, Wis. With Oscar Wilson he has been elected a director, the two taking the places of Wm. Schutte Jr., and C. O. White, resigned.

Philip Fosdick, Cincinnati, who recently retired from active participation in the machine tool business, has been elected a director in the W. A. Stone Coal Co. of that city and will devote a portion of his time to developing the coke department of this company.

J. A. Armstrong, of Connellsville, has been elected to the directorate board of the Scottdale Foundry & Machine Co., Scottdale, Pa. F. A. Ryder, general manager, has resigned and E. L. Rutherford has since been in charge of the plant.

H. M. Cryder has resigned his position as principal assistant engineer of the Wabash railroad, to become manager of the Wm. P. Carmichael Co., engineer and contractor, St. Louis, in charge of the western district. The company makes a specialty of railroad masonry and buildings, reinforced concrete and concrete buildings.

Henry A. Carpenter, of Providence, R. I., C. Bermingham, of Kingston, Ont., Stanley G. Flagg Jr., of Philadelphia, Irving H. Reynolds, of Youngstown, O., and G. E. Emmons, of Schenectady, have been appointed a committee from the National Founders' Association to recommend a successor to Commissioner A. J. Caldwell, of Detroit, whose resignation was noted in a recent issue.

Harry R. Hall, formerly superintendent of the Parryville furnaces, has been appointed superintendent of the Crane Iron Works, at Catasauqua, Pa. Mr. Hall is a graduate of Ohio State University, class of 1889. He has been in charge of furnaces in the northwest since leaving Parryville several years ago, and was at one time chemist of the Crane Company. He succeeds H. A. Knauss who goes to Standish, N. Y., to become superintendent of the Northern Iron Co.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, addressed the Pittsburg Foundrymen's Association on the evening of Feb. 4. He and Thomas D. West, president of the American Foundrymen's Association spent Tuesday evening, Feb. 5, in Cleveland, where they met a number of prominent foundrymen to make preliminary arrangements for the meeting of the American Foundrymen's Association to be held in Cleveland in June. The doctor left Cleveland on Tuesday night for an extended trip through the west where he is to look after some mining interests for eastern capitalists. The trip includes California and the Pacific northwest, and will occupy about a month.

One large coke operation in the Connellsville region has twelve thousand men out on strike. It is believed to be only a temporary difficulty.

OBITUARY.

J. J. Coon, prominently connected with a number of business enterprises at Toledo, O., died Feb. 8, at the age of 65. He was president of the Iron Elevator Co.

Ezra Sawyer, formerly a director in the Union Water Meter Co., died Jan. 31, aged 90 years, at Worcester, Mass. He invented and manufactured a metal separating machine.

Edward J. Kelly, aged 73, died from pneumonia at his home in Monongahela City, Pa., Feb. 8. He was one of the organizers of the Monongahela Mfg. Co. and later engaged in the foundry business.

Robert Seabury Conger, member of the firm of Irving K. Farrington & Co., mining brokers, of 15 Wall street, and treasurer of the Wall Street Mining Stock Exchange, died Feb. 9, after a brief attack of pneumonia. He was 32 years of age.

Harry Gunther, president of the Collins-Gunther Machine & Supply Co., San Antonio, Texas, died at his home in that city, Feb. 5, aged 42 years. He had been engaged in the machine business since his youth and was president of the Gunther Foundry & Supply Co. before becoming interested in the Collins-Gunther Company.

Anderson Fowler, of New York, died recently on the steamship Republic in the harbor of Genoa while on his way for a tour of the Holy Land and Egypt. He was interested in a number of enterprises, being vice president of the Chapman Iron, Coal & Coke Co., and a director of the Allegheny Ore & Iron Co. His son, A. A. Fowler, of New York, is a partner in Rogers, Brown & Co.

Malleable Plant Purchased.—The Eberhard Mfg. Co., Cleveland, has purchased the plant, stock and good will of the Racine Malleable & Wrought Iron Co., of Racine, Wis. Rumors to the effect that this transaction was concluded by a group or syndicate of buyers were incorrect. The purchase was made by the Cleveland concern alone and for its own exclusive use in connection with its increasing northwestern business in malleable iron, carriage, wagon and saddlery hardware.

Negotiations Suspended.—Rogers, Brown & Co. have been in negotiation with Joseph Barry with a view to operating the Wayne furnace at Detroit as a coke furnace. It is now a charcoal furnace. These negotiations have been suspended as it was found not to be feasible.

A NEW PROCESS FOR RENDERING IRON AND STEEL NON-CORROSIVE.

BY SHERARD COWPER-COLES.

The processes that are at the present time employed for rendering iron and steel non-corrosive may be classified as follows:

1. Coating of the iron with a protective film composed of oil and varnish mixed to give body and durability.

2. Coating the iron with a magnetic iron oxide.

3. Coating the iron with a metallic coating, such as copper, tin, or zinc.

This article is limited to the coating of iron with zinc protective coverings, which again may be sub-divided under three heads.

1. Hot, or molten galvanizing; 2, Electro or cold galvanizing; 3, Dry galvanizing or "Sherardizing."

Hot Galvanizing.

Hot or molten galvanizing consists of immersing the article to be coated with zinc into a molten bath of that metal. The temperature of the molten zinc ranges from 800 degrees F. to 1,000 degrees F. and is varied in accordance with the thinness of the coating required, the higher the temperature the thinner being the coating.

High economy is not always obtained by raising the temperature of the metal to obtain thinner coatings of zinc, as the waste of zinc is greatly increased, and the amount of zinc-iron alloy formed becomes a very serious item of cost. The life of the iron retaining baths is much reduced, and therefore the temperature is generally kept as low as possible, and the excess of zinc is removed by shaking the articles, or if of suitable section, by passing it between rollers of sand resting on the top of the molten zinc. Wire is galvanized by passing a number of wires, say 10 to 20 arranged in parallel, through a bath of molten zinc, and kept submerged by porcelain guides. As the wires emerge they are either passed through sand or through asbestos rubbers to remove the extraneous molten zinc.

In Heathfield's galvanizing machine, turning out twelve tons or more of galvanized sheets in 10½ hours, muriate of ammonia is placed in one end of the bath through which the plates enter, and sand at the end through which the plates leave the molten zinc. Messrs. Davies & Sons, of Wolverhampton have developed a system of wet rolling the plates after annealing and pickling. This is stated to give a more uniform coating of zinc with a small consumption of spelter. Another process of galvanizing wire consists of placing the entire coil into molten zinc and then removing the surplus metal by centrifugal force in a suitable apparatus.

An improved process for galvanizing wires is by means of the "Goodson" apparatus. The wire is led through a U-shaped bath containing molten zinc, which is heated by electricity through an outer resistance tube. The effect claimed for this apparatus is that the heating of metal electrically produces a molecular action by which the zinc more readily adheres to the surface to be coated and that less dross is formed, as only a small portion of the metal is exposed to the air. The amount of zinc required for

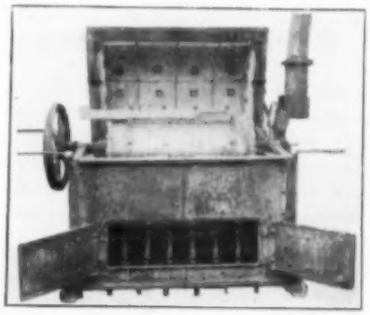


FIG. 1 —RECEPTACLE FOR SHERARDIZING.

galvanized wire netting is considerable due to the filling of the interstices in the twisted wire. This difficulty has been overcome by making wire netting with the mesh welded together by means of a row of small electric welding machines.

The process of hot galvanizing is an expensive one, due to the necessity of keeping the zinc in a molten state day and night. The zinc, especially when overheated, rapidly dissolves the iron bath, and also dissolves some of the iron from the articles immersed in the molten zinc. This results in a large quantity of iron-zinc alloy in the bath of molten zinc, which must be removed at short intervals. One of the chief advantages of hot galvanizing as compared with other processes is the rapidity with which the work can be done. It is, however, more costly than electro or dry galvanizing on account of the large quantity of zinc required with the resultant formation of considerable quantities of zinc-iron alloy.

Electro-Zincing or Cold Galvanizing.

The process of depositing zinc by electricity was practiced before hot galvanizing. It was abandoned, however, on account of the difficulties encountered. The chief trouble was the uncertainty as to the quality of zinc deposited and the formation of zinc sponge. Also, efficient low tension dynamos could not be obtained at that time. The process was successfully reintroduced about ten years ago, the difficulties which had been met with before were overcome and the operation has been rendered so simple by the introduction of the regenerative process that any intelligent workman can use it.

The process, briefly, consists of placing the articles to be coated in a solution of zinc sulphate with or without aluminum sulphate. Zinc or lead plates are suspended in the bath through which the electric current is conducted into the solution. The zinc plating solution is circulated by means of compressed air or a centrifugal pump through the depositing tank constructed of broken coke and zinc dust. As the solution passes through the filter bed the zinc dust is dissolved thus replacing the zinc which has been electro-deposited on the iron-work that is suspended in the bath.

Small articles as bolts, nuts, etc. are electro-galvanized by placing them into a revolving drum or barrel suspended in the zincing solution. One of the latest arrangements consists of a drum mounted in bearings. Within the drum a helical plate provides a continuous helical channel around the inside of the drum. In this channel the articles travel by gravity from one end to another as the drum is rotated.

The following is an estimate of cost for zincing 15 tons of small articles per week of seventy-five hours with 1¼ ounces of zinc per superficial foot. Large articles such as plates can be electro-zinced at 30 shillings per ton:

COST OF ZINCING.

	£	s.	d.
Labor, piecework, at 1 shilling per cwt.	15.	0.	0.
Incidental expenses, 15 per cent on labor	2.	5.	0.
Yard labor, 10 per cent on labor	1.	10.	0.
Zinc, 448 pounds at £17 per ton	3.	8.	0.
Electrical energy at 1d per B. T. U.	5.	0.	0.
Pickling at 5 shillings per ton	3.	15.	0.
Rent of buildings at 10 shillings per week	..	10.	0.
Interest on capital, 10 per cent per annum	1.	8.	2.
Depreciation on plant, 15 per cent	2.	2.	3.
Total	34.	18.	5.

Cost per ton, £2 6s 7d.

Dry Galvanizing or Sherardizing.

A point of interest about this new process is that iron and steel can be coated with a thin, even deposit of zinc at a temperature several hundred

degrees below the melting point. The preparatory operation is to free the iron from scale or oxide by pickling or sandblasting.

The articles to be coated are placed in an iron receptacle, Fig. 1, which can be closed to render it almost air tight after it has been charged with zinc dust. It is then heated to a temperature between 500 and 600 degrees F. for a few hours and allowed to cool. The iron articles, on opening the receptacle, are found to be coated with a fine homogenous covering of zinc, the thickness depending upon the temperature and the length of time of heating. The low temperature used and the fact that no zinc is wasted and that it is evenly distributed over the iron surface makes the process cheap as compared with the process of dipping. It also has the advantage that it does not deteriorate iron and steel of small section to the same extent as hot galvanizing.

The deterioration of the iron drum is negligible. A drum which had been in use for over two years, on inspection was found to be in perfect condition and free from all zinc incrustations. The author believes that this was due to the fact that the temperature of the drum is higher than the temperature of the zinc dust. This process is not limited to the covering of iron with zinc, but has been applied to coating iron with copper, aluminum and antimony. It has also been applied to coating various other metals, as aluminum and copper with zinc. Copper and its alloys subjected to this process are case hardened on the surface.

The zinc powder used in this process is the zinc dust of commerce and should not be confused with zinc oxide. It is obtained during the process of distilling zinc from its ores. Its average price during the year 1904 was £20, 12 shillings per ton, which is about five per cent lower than the average price of virgin spelter.

One of the properties of zinc dust is that it cannot be melted or reduced under ordinary conditions, even when heated to a very high temperature under considerable pressure. This property is advantageous to the new process of dry galvanizing, as it does away with the risk that there might otherwise be, of melting the finely divided zinc by overheating the furnace. The receptacle in which the zinc is placed and heated is perferably air tight and the air exhausted so as to prevent the formation of zinc oxide. If this is not feasible it is found advisable to add about 3 per cent of carbon in a very fine state of division. If the percentage of oxide is allowed to increase beyond certain limitations, it is found that the deposits become dull in appearance, instead of having a metallic lustre. The tighter the zinc dust is packed the better the results obtained, both as regards the closeness of the deposition and the thickness of zinc. The following is a result of a set of experiments:

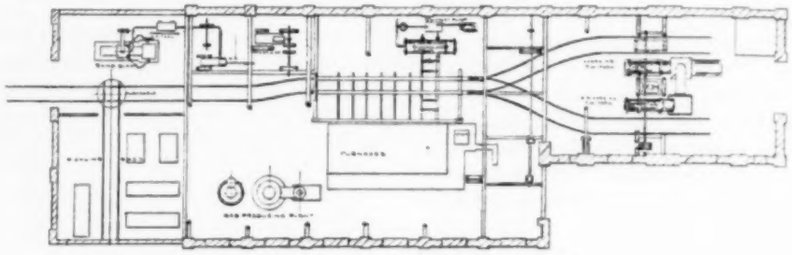


FIG. 2.—PLAN OF SHERARDIZING PLANT.

SHERARDIZING UNDER VARIOUS CONDITIONS OF PACKING.

Zinc	dust	Condition	Temperature	Weight of Deposit	Wgt per sq. ft.
"	"	alone. Loose.....	920 degrees F.	1.55 grams.	2.09 ounces.
"	"	alone. Packed	930 " "	1.67 "	2.25 "
"	"	and 2 per cent carbon. Loose...	920 " "	1.025 "	1.38 "
"	"	and 2 per cent carbon. Packed...	925 " "	1.54 "	1.96 "
"	"	alone. Packed	640 " "	.14 "	.18 "
"	"	and 2 per cent carbon. Packed..	652 " "	.29 "	.36 "

Articles coated with grease receive as good, if not a better coating of zinc than those which are free from grease. This fact enables machined work to be placed directly into the dry galvanizing drum without any preparation or cleaning. Metals can be coated by this process with a thick paste composed of grease and zinc dust, and then heated in a closed receptacle. The articles, when they have been heated in the zinc dust for the period necessary to obtain the thickness required can be removed

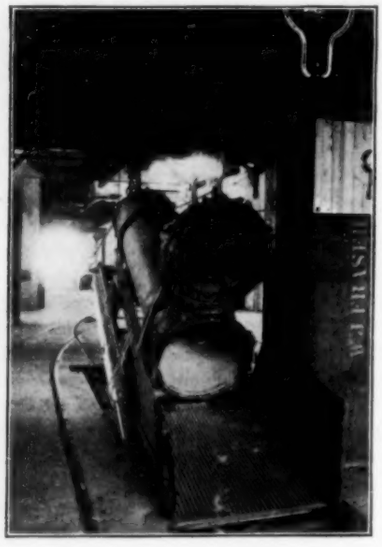


FIG. 3.—SHERARDIZING CHAMBER ON TABLE.

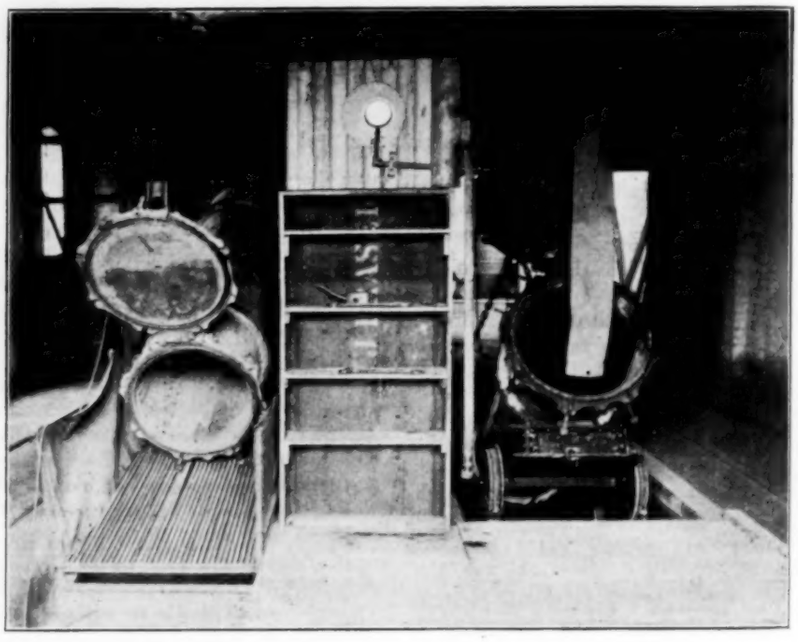


FIG. 4.—SHERARDIZING CHAMBERS READY FOR CHARGING AND DISCHARGING.

whilst the zinc dust is still hot. A better practice is to allow the zinc dust to cool to a temperature at which the article can be readily handled. The deposit of zinc is then whiter and less oxide is formed.

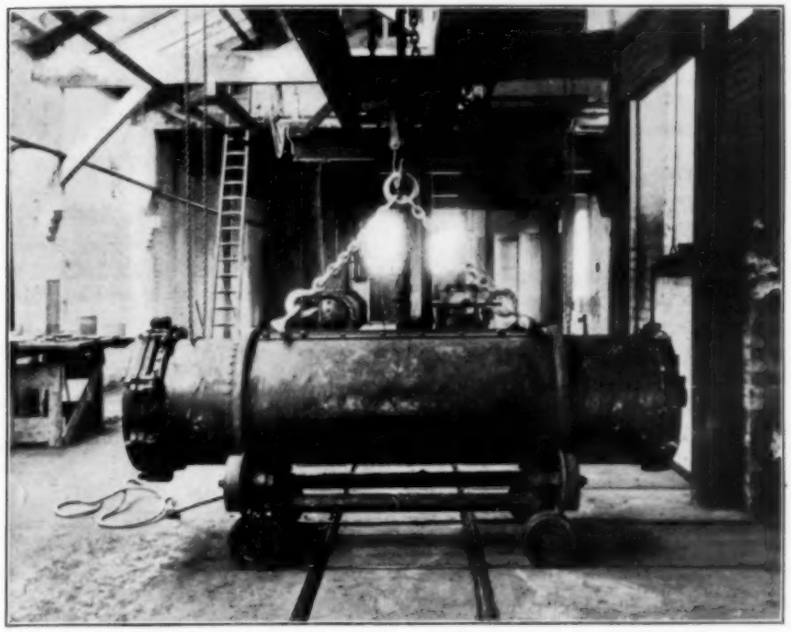


FIG. 5.—SHERARDIZING CHAMBER AND FURNACE TRUCK.

A useful type of furnace for small work consists of a closed iron chamber in the form of a cylinder or polygon and arranged to be rotated or oscillated about an axis. The chamber is provided with an iron door either at one end or at the side, depending upon the class of article to be treated. The side door is most suitable for small articles, the end doors or tubes for oblong or cylindrical articles.

In the latter case the cylinder is oscillated on its axis and in the former it is rotated and provided with baffle plates to insure the articles being turned over and becoming uniformly coated. When the articles in the drum are kept moving the action is much quicker than when the drum is kept stationary. The weight of zinc for a given time and temperature was 1.96 ounces as against 4.7 ounces when the drum was revolved.

Fig. 2 shows the general arrangement of a dry galvanizing plant, which has been erected near London. It comprises four furnaces capable of taking drums of 8 feet by 2 feet and with a cubic capacity of two tons of material. The furnaces are heated by producer gas being introduced at the back of the furnace. This is then conducted through brick channels into which air is drawn, the gas being burnt after passing through cast-iron burners.

The charging of the drums is accomplished by running the truck on which the drum is placed onto a table as in Figs. 3 and 4. One end is then lowered and the zinc dust is charged from an upper floor by means of a chute. An iron grating is provided which allows the zinc dust to fall into a chamber below, from which it is removed by means of an elevator to the floor above. When the drum charged with zinc dust, and the articles to be galvanized are brought to a horizontal position, the air is exhausted and the truck placed upon the furnace truck, Fig. 5. It is then pushed into the furnace, the door lowered, and heated up to the desired temperature.

When it has been in the furnace a sufficient time it is withdrawn, transferred to another carriage and run to an open yard where the drum and contents are allowed to cool to a temperature low enough to permit of easy handling.

The surfaces obtained by hot and cold and dry galvanizing are different in each case, but they can readily be distinguished; in the case of cold galvanizing the surface is free from spangles and has a matted or frosted surface, uniform if the work has been well executed. Dry galvanizing is distinctive from the two former processes. Its general appearance resembles cold galvanizing more than it does hot galvanizing. It is more lustrous and metallic than the former and it is uniformly distributed over the whole surface. The following table gives the weight of zinc deposited for varying temperatures and time:

RESULTS OF SHERARDIZING WITH VARIOUS TEMPERATURES.

No.	Temperature.	Time.	Weight before.	Weight after.	Zinc.	Ounces per sq. ft.
1.	350 degrees C.	½ hour	49.470	49.545	.075	.18
2.	350 " "	1 "	48.905	49.025	.120	.28
3.	450 " "	½ "	48.290	49.950	.660	.54
4.	450 " "	1 "	48.612	49.740	1.128	.93
5.	500 " "	½ "	49.027	49.700	.673	.60
6.	500 " "	1 "	49.508	50.900	1.392	1.20

In Fig. 6 is shown a plate coated with zinc by the dry galvanizing process. A thick deposit gave an analysis of 92.44 metallic zinc and 7.56 metallic iron. A thin deposit showed 89.63 metallic zinc, and 10.37 metallic iron. Fig. 7 shows zinc electro deposited by the regenerative process from a solution of zinc sulphate. Fig. 8 shows a micrograph of hot galvanizing, the line in the center showing the line of demarcation between the crystals and spangles.

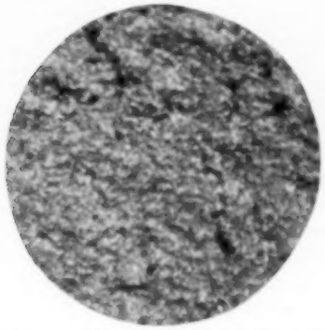


FIG. 6.—SURFACE OF SHERARDIZED IRON.

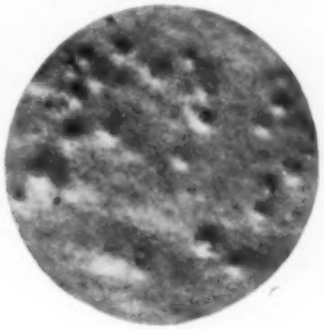


FIG. 7.—SURFACE OF COLD GALVANIZED IRON.

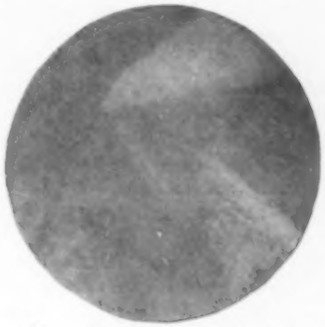


FIG. 8.—SURFACE OF HOT GALVANIZED IRON.

Preece's test, namely, dipping in the

solution of copper sulphate is not sufficient to test the zinc obtained by dry galvanizing, as is shown by the following figures:

RESULTS OF PREECE'S TEST.

Minutes immersion required to obtain a copper deposit.	Time required to remove zinc.	Actual weight of zinc.
7 minutes corresponding to 1.764 ozs. zinc.	24 minutes corresponding to 6.04 ozs. zinc.	1.62 ozs zinc per square foot.
6 minutes corresponding to 1.512 ozs zinc.	15½ minutes corresponding to 3 90 ozs. zinc.	1.27 ozs. zinc per square foot.
7 minutes corresponding to 1.764 ozs. zinc.	17⅛ minutes corresponding to 4.41 ozs. zinc.	1.53 ozs. zinc per square foot.

In practice, dry galvanized iron and steel is found to withstand to a remarkable degree, the ordinary corrosive agents to which galvanized iron is exposed. Even after the removal of all the zinc by filing or abrasion, the iron is still non-corrosive. This property is doubtless due to the protective action of the zinc-iron alloy formed on the boundary line between the iron and zinc, Fig. 9.

A number of iron samples, as bolts, nuts, nails, etc., were tested for corrosion in the following manner: One set of samples was divided into four batches and were exposed:

1. To the atmosphere of the laboratory. 2, To action of water and air out doors. 3, Buried in damp earth for seven weeks. 4, Exposed in the laboratory for fourteen days and afterwards out doors.

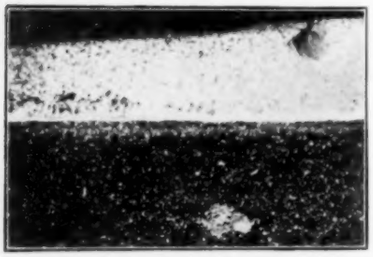


FIG. 9.—PHOTOMICROGRAPH SHOWING GRADATION ZINC TO IRON—UPPER WHITE LAYER IS ZINC.

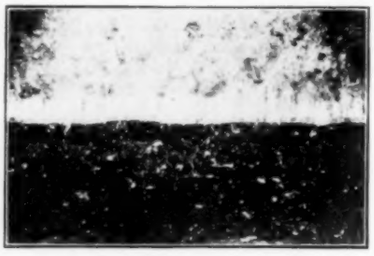


FIG 10.—PHOTOMICROGRAPH SHOWING GRADATION ZINC TO IRON—UPPER WHITE LAYER IS ZINC.

In all cases, plain steel articles and ordinary galvanized goods were exposed under the same conditions for comparison and were constantly moistened with water. The second lot of samples were divided into three batches and exposed: 1. Continuously in the laboratory. 2. For seven days to the action of strong acid and corrosive fumes, and for one month in the open air. 3. Entirely in the open, being kept moist with water. In both lots of samples, the coating was removed by filing in places.

Under all the above conditions, ordinary iron goods rusted rapidly in a day or two. In cases where samples of the second lot were exposed for seven days near the acid flue carrying the fumes from the laboratory, rusting and corrosion took place in a few hours. This test is a most severe one. In all cases, both in the first and second lot, it was found that the resistance both of corrosion and oxidization is equal to the best galvanized goods, and even when part of the zinc coating is removed by filing, the oxidization is very slight.

Other samples of dry galvanized specimens were tested in the following manner: 1. By exposing some of them in the open air for several days and nights to alternations of moisture and dryness, moisture being freely supplied. 2. By mechanicaly removing a portion of the coated surface from others and similarly exposing them. 3. By cutting deeply into the body of others and similarly exposing them. The results as regards 1 and 2 were that no change whatever took place in the appearance of the articles. There were no indications of oxidization even where the surface coating had been removed. As regards 3, near the outer edge of the incisions there was no oxidization. As the cuts into the metal deepened and exposed the iron or steel, oxidization occurred.

As dry galvanizing is accomplished at a lower temperature than hot galvanizing, the temper of the steel is not affected. Steel bolts dry galvanized at varying temperatures were found equal in tensile strength to bolts which had not been dry galvanized.

The process has the following advantages over hot galvanizing: There is no waste of zinc dust due to the formation of zinc alloys, consequently the fuel consumed is less. The labor is less, the articles not requiring to be cleaned so carefully as in hot galvanizing. The cost of working is lower, the plant is cheaper, no flux is required, no dross or skimmngs are formed as in hot galvanizing, and there is no danger of explosion or breaking of castings and distorting of thin iron work. In dry galvanizing the coating is more uniform than that obtained in hot galvanizing. There is no reduction of tensile strength. The process can be worked intermittently without waste and the work can be placed directly from the pickling bath without drying. Among other applications this process has been applied to case-hardening copper, and the rendering of silver non-tarnishable.

NEW ORE CARS ON THE C. & N. W. R. R.

The Chicago & Northwestern Ry. has recently placed in service a new type of ore car, which has been designed to do away with the objections of the usual type with end and side slope hopper and with doors swung transversely across the car. The new design is of steel construction with a wooden lining. Wood is used to minimize the adhering of ore to the side of the car in freezing weather. The side slope of the former design of hopper has been omitted, the entire side being straight. The car sides are given a slight inclination inward from the vertical, the car being 4 inches wider at the top than at the bottom. The door opening has been made larger, this resulting in a slightly longer wheelbase.

The door openings are 6 feet 4 inches by 3 feet 7 inches. The drop doors are hinged to the car sides and each is supported at its opposite and inner side by chains passing around winding drums on a longitudinal shaft. The doors are raised by a lever and ratchet at the end of the shaft and car. They fall by gravity upon releasing the ratchet pawl. The advantage of side-swung doors is that in their lowered position they form the side slopes of the hopper, thus confining the ore between the rails.

It has been found possible to unload cars of this type in from one to three minutes, depending upon the condition of the ore. Maple lining is used. The capacity of the car is 80,000 pounds. They are mounted on steel trucks, and a brake cylinder is provided for each truck.

More Schools Needed.—At the annual convention of the National Brick Manufacturers' Association, held in Philadelphia last week, President Blair spoke of the necessity of increasing the number of trade schools in the United States, stating that the industry had lost millions of dollars through the scarcity of mechanics. G. W. MacNees, of Kittanning, Pa., stated that the brickmaking industry was receiving a serious check as a result of the action of trades unions by limiting the supply of skilled brickmakers through their manipulation of the apprenticeship system.

FOUNDRY PROBLEMS.[1]

BY DR. RICHARD MOLDENKE.

It gives me great pleasure to say a few words to you tonight, more especially as the best part of my rather active life was spent in your midst, and daily contact with the enormous industrial development of this iron center has ripened an experience gained by close application to foundry problems, and interchange of thought on theory and practice with the members of our association. Indeed I count as the most beneficial times of my life, the evenings spent with you at these meetings during the ten years in which we helped to revolutionize the foundry practice of the civilized world.

But even today, with all the advance made in the art, we have by no means completed the work. The problems are not as easily solved, or easily recognized. They are as it were the building out of a superstructure on the solid foundation of practically applied foundry science. We can now all specify the metal we want for our particular purpose. We can handle the cupola and air furnace so that we know what we do. We can calculate our mixtures to a nicety of composition and minimum cost. But we have still to know why some irons make better rolls than others of like composition, and how far we may trust ourselves to hold the gray iron foundry against the invasion of the steel casting and yet give the buyer the best for his purpose that he can obtain.

It is a very noticeable fact that foundrymen all over the world are recognizing the necessity of accurate information on all the lines of their work. The responsible head of a foundry no longer can be told by his subordinates that unless such and such irons are had, no castings can be made. These autocrats of former days are asked to step aside, and the result usually is a greater output per man, and cheaper castings in that shop.

Even the associations organized for labor purposes only are finding it desirable to enliven their meetings by an occasional paper on foundry practice, and the result is certainly a benefit. The foundrymen of the Pacific coast are also alive to this work, and we shall soon hear more from them. England and Germany are vieing with us to promote the welfare of the industry from the technical standpoint, and we can everywhere recognize the earmarks of important foundry problems which it is up to us to solve.

These problems are perhaps best separated into two general classes:—First, the production of castings at the lowest possible shop cost; and second, the development of the highest grade of materials in these castings. The greatest ambition of every foundryman worthy of the name, is to give the very best he can to his customer, at the lowest cost to himself, and with a fair living profit. Just how this may be accomplished must be considered more at length. The special problems are those every foundryman must have solved by the men he has trained to his work. The general ones form the work of committees established by our foundrymen's associations.

Taking the general needs of the foundry first, we see that as we reduce the impurities of that complex substance—cast-iron—we get nearer a uniformly good material. The addition of steel to cast iron does this very thing, and is therefore to be encouraged and studied much more than has been the case so far. The real benefit being in the reduction of the total carbon, with the consequent reduction of the graphite, everything else in the composition being so arranged that the combined carbon remains small, the consequence is a purer cast iron, but yet a cast iron. Now the technical difficulties in using steel in the cupola are such that with large amounts correctives must be applied. The study of this problem must be held the most important today, as bearing directly on the gray iron foundry holding its own. As the price of steel will undoubtedly go up, methods of refining iron in the air furnace will be studied more closely, and far-seeing foundrymen are giving this subject their earnest attention. Perhaps the ultimate result will be the use of the open-hearth where the output will warrant it.

This subject brings us to further ideas in connection with the reduction of the impurities in cast iron. We are looking for an efficient method of removing sulphur from iron, either by removal from the coke used in melting, or from the pig metal in its making, or more likely from metal and coke in the foundry melting. There is no reason why this object may not be attained. Only the demand for higher grade castings will stimulate research, and the sooner it is started systematically, the better.

Whether it will ever be important enough for us to worry about the removal of phosphorus from cast iron I cannot say, for so long as Bessemer ores exist, we can select our irons in this respect from a great variety of brands. Manganese is apt to be getting higher in our pig irons, and it is a question whether some day a washing process will not have to be resorted to at the blast furnace, with the addition of high silicon to get the metal right again for the foundry. Bear in mind that our aim, no matter what we can or cannot do with high or low manganese, must be directed to a cast iron with the minimum of impurities consistent with the proper regulation of the combined carbon content.

With sulphur, carbon, manganese and phosphorus attended to, we have remaining only the silicon, and the oxidation effects, dissolved gases, and the like, which may make or mar an iron, usually unbeknown to us. Briefly the silicon will always be the basis of our calculations, as even with a minimum of total carbon, due to the addition of as much steel as we can handle, the machine shop will demand properties in the castings which compel us to keep the combined carbon below fixed limits. The less the graphite on top of this, the better for strength.

The oxidation of metals during the melting process is now becoming a well recognized matter. We are still, however, looking to our laboratories to give us something tangible to work with. Here is the most important problem for the foundry chemist. What untold losses this trouble in the foundry is the basis of, and how convenient a scape-goat it becomes for troubles it has no connection with, can hardly be realized. Even in the making of steel castings, aside from the loss of the elements by burning out to get the proper composition for the ingots there is a wasting of the metal, or oxidation, which makes many a foundryman very tired. A further problem is then before us. How to melt iron or steel, for that matter, without burning away from 4 to 14 per cent. Perhaps the electric furnace will solve this for us. It has certainly done it already from the technical standpoint, and awaits only the commercial efficiency to become a permanent factor in our foundries. The probability is that the small steel casting will see the beginning of this interesting development in foundry practice. Every year sees new ideas worked out, the object of which is the enlargement of our means to obtain a variety of results with the least hindrance to the shop.

Thus the recent use of very high iron-silicon alloys by Mr. Outerbridge, with which he takes an average low silicon mixture and adds the alloy in the ladle, bringing it up at once to a soft metal, is an example of getting the greatest variety of metal with the least trouble. With close watching that the mixture is uniform, and with the silicon in the alloy very high, no appreciable

[1]Address to the Pittsburg Foundrymen's Association, Feb. 5, 1906.

cooling of the ladle will result, and there is accomplished what could not be done satisfactorily with the use of low silicon scrap and softeners in the cupola charge. Thus another problem has been solved in its way, and a direction pointed out in which possibly the oxidation trouble can be solved—namely by high class de-oxidizers in the form of ferro-alloys easily susceptible to oxidation at the comparatively low temperature of melted cast iron.

So much for some of the problems of the foundry that relate to the raising of the intrinsic quality of the metal. When it comes to the other phase as mentioned above—the reduction of the cost of production to the lowest point compatible with good work—we strike questions of foundry practice, a subject so ably handled by Mr. Bole, that I will not trench on his field, but simply say that specialization is the keynote of the many ways of solving this foundry problem. Specialization not only in the product of the foundry, but specialization on the part of the men employed in perfecting the specialties to be made. A perfect organization into the finest detail, exact and easily managed cost accounts, and a good man at the helm.

Gentlemen:—I commend these problems I have but lightly touched upon to your attention as foundrymen and as members of a very live organization. Join with other societies in bringing together information, but above all work with a spirit perfectly free from the personal reservations a business man is apt to make to retain a point in his favor.

Even the few things I have pointed out tonight will show what a chance there is to get in line with the aim of true political economy. To make the very best use of the resources of our country without any waste of them. If a given casting weighs half as much when of steel as of gray iron; if in the making of that steel less material is lost, labor used, etc., than will balance the extra weight of the gray iron; then the country should be given the benefit of the steel, and gray iron discarded. If, on the other hand, we can so improve our product that the extra cost of the making in steel does not counterbalance the additional small amounts of cast iron we put in, then will the gray iron foundry be in the line of true economy and will hold its own in spite of any attacks that may be made. We cannot resist the inevitable but if we set ourselves right, and that by knowing thoroughly what we are doing, we can rest easy. This is what forms our most important foundry problem. Costs may go up or go down. They do so on all classes of material, whether gray iron or steel; but quality should always go up, and never down.

From the splendid talent Pittsburg has always possessed there is no reason why we should not see the desulphurization of iron accomplished in the cupola melting process; to see further such lines of procedure worked out that every foundryman can use his steel scrap with efficiency and good results. Further, to have an alloy prepared which will attend to the oxidation of the metal in our ladles, and finally to manipulate some of the many good furnaces electrically so as to make small gray iron, malleable or steel castings good and cheap.

I give these problems to the association I have had the honor to belong to almost since its beginning, and trust that every year will see substantial progress made.

SLOVENLY ATTENTON TO EXPORT CORRESPONDENCE.

Among the failings of American manufacturers who make some effort to obtain export business, says the International Weekly edition of the New York *Commercial*, there is one which is grossly neglected in consular reports, as compared with its companion faults, such as poor packing, short credits, etc. This fault, probably as detrimental as any to the progress of export trade, is slovenly attention to export correspondence. It would seem as though a merchant who has an opportunity to open up trade relations with a new customer in some remote part of the earth would be sufficiently interested to handle his correspondence in a business-like manner, giving adequate attention to all questions asked, and treating of business matters in terms familiar to the customer.

As a matter of fact, the number of American houses which answer their foreign letters in a manner acceptable to their foreign customers constitutes a very small proportion of the whole.

The unwillingness of American manufacturers to communicate with their foreign friends in foreign languages is by no means the only charge entered against them, though it may be the most remarkable. It is not unusual for foreign houses to write in their own language and state that they can correspond in English, if desired, which makes it permissible for the exporter to exercise his own choice. Under any other conditions, when a letter is received in Spanish, German or French, there is every reason in the world why it should be answered in the same language, and no reason why it should not, except shiftlessness.

It is also common for foreign importers to request quotations, including inland and ocean freight and marine insurance, in order that they may ascertain the cost of the goods delivered at their seaport. Probably in three-quarters of the cases this request for information is wholly ignored by the American, usually on the ground that he has not at hand the information which would enable him to estimate freight charges. This excuse is as ridiculous as it is shiftless, for correspondence with the steamship companies or forwarders could easily bring to hand the information, with which in his possession the foreign importer could form some adequate idea of the actual cost of the merchandise to him.

Another failing of the American is his negligence in the matter of explaining technical terms or trade phrases which are meaningless abroad. This applies not only to statements of terms, discounts, etc., but also that catalog announcements. Contradictory statements as between catalog and letter are also complained of frequently, as in the case of a firm which in its catalog makes prices f. o. b. factory, and in its letter offers export figures f. o. b. seaport. Blunt and tactless statements of terms of payment are also very much too common in the letters of exporters. In his domestic business the manufacturer would know how to be polite when refusing to extend credit, and no reason appears why he should not be equally considerate of his foreign customer's feelings.

One item of information which would always interest the buyer very largely, and which would require but a brief paragraph in any business letter, is that with reference to export packing. If the manufacturer gives particular attention to this important detail, he could make it known to his prospective customer with great advantage both to himself and to the customer.

Foreign merchants are as a class, much more punctilious in their observance of business etiquette than Americans, and for this reason their correspondence is usually much pleasanter reading. They are extremely quick to detect any lack of business courtesy on the part of their correspondents and even inclined to resent as a personal affront the somewhat brusque statements often found in American business letters. Many of the exasperating and disappointing experiences of which exporters often complain might never have occurred had the exporters exercised in their foreign trade relationships the fundamental requirements of thoroughness and politeness with which they handle their home affairs.

The Sharpsville Furnace Co., will blow in its furnace about April 1, after having been out of blast for several years.

TECHNICAL INSTRUCTION BROADENING.

New Railway School at University of Illinois—Naval Academy Increases Facilities—Andrew Carnegie Scholarship.

In a short time THE IRON TRADE REVIEW will be able to present a complete description of the splendid new engineering building which is nearing completion at the University of Pennsylvania. The work has been one of large proportions and will doubtless mark a distinct advance in university equipment for technical instruction.

University of Illinois.

At the opening of the fall term next September, the University of Illinois will inaugurate a new railway school. This project will place the institution among the first to recognize the place which railway engineering has come to occupy among the other technical pursuits and is indicative of the increasing number of technical men who are engaging in this branch of industry. The school is intended to have three departments which will cover the entire range of railway work. One department will treat of the problems of construction and maintenance of way for both steam and electric traction. Another branch will include power and its application, being especially adapted to instruction in stationary mechanical and electrical engineering. The problems of operation, organization, financiering, rate making and kindred phases will comprise a third division of the school. It is hoped that the student will thus be prepared to enter upon railway engineering or management in any department.

Lehigh University.

The mechanical engineers of the senior class recently made a four-day inspection trip to New York. Among the places visited were the North German Lloyd ship, Kaiser Wilhelm der Grosse, battleship Kearsarge, the Edison Waterside Station, the Manhattan Power House, the Subway Power House, the De La Vergne Refrigerating Machine Works, the Brooklyn Navy Yard, the Worthington Pump Works, at Harrison, N. J., and Stevens Institute of Technology.

E. Le B. Gardiner, president of the East Jersey Water Co., recently lectured before the college on the "Present Methods of Obtaining and Distributing a Municipal Water Supply." On Friday, Jan. 19, Chas. B. Dudley, chief chemist of the Pennsylvania railroad, spoke on the "Work of a Chemist on the Railroad."

The American Institute of Mining Engineers will hold its next session, beginning Feb. 21, at Lehigh. President Drinker of the university being one of the founders of the Institute, and the school of mining engineering being the place of first meeting in 1871, the university is a fitting place to hold meetings of the institute whose growth it has fostered.

Charles L. Taylor, E. M., '76, prominently known in iron and steel circles, has been elected a member of the board of trustees of the university. Mr. Taylor, as one of the most illustrious alumni of Lehigh, will bring to the government of the university the benefit of his splendid ability which has earned him so high a place in the various Carnegie interests.

Iron and Steel Institute.

The Iron and Steel Institute issues the following bulletin calling attention to the Andrew Carnegie research scholarship:

"A research scholarship or scholarships, of such value as may appear expedient to the council of the Iron and Steel Institute from time to time founded by Mr. Andrew Carnegie (past-president), who has presented to the Iron and Steel Institute eighty-nine one-thousand dollar 5 per cent debenture bonds for the purpose, will be awarded annually, irrespective of sex or nationality, on the recommendation of the council of the Institute. Candidates, who must be under thirty-five years of age, must apply on a special form before the end of February to the secretary of the Institute.

"The object of this scheme of scholarships is not to facilitate ordinary collegiate studies, but to enable students, who have passed through a college curriculum or have been trained in industrial establishments, to conduct researches in the metallurgy of iron and steel and allied subjects, with the view of aiding its advance or its application to industry. There is no restriction as to the place of research which may be selected, whether university, technical school, or works, provided it be properly equipped for the prosecution of metallurgical investigations.

"The appointment to a scholarship shall be for one year, but the council may at their discretion renew the scholarship for a further period instead of proceeding to a new election. The results of the research shall be communicated to the Iron and Steel Institute in the form of a paper to be submitted to the annual general meeting of members, and if the council consider the paper to be of sufficient merit, the Andrew Carnegie gold medal shall be awarded to its author. Should the paper in any year not be of sufficient merit, the medal will not be awarded in that year."

The United States Naval Academy.

At no technical institution are the engineering subjects more up-to-date and complete than at the government academy at Annapolis. The marine engineering department includes subjects intended to make the students not only tacticians but also skilled engineers, and the courses are of necessity maintained to keep pace with the constant improvement and change in the machinery of the modern navy. A large increase in the number of students which bids fair to approach 1,000 next June, has made necessary an enlargement of facilities for teaching. Accordingly, a considerable part of the $10,000,000 appropriation granted by Congress has been used for the erection of the new marine engineering and naval construction building. The new structure is 266 x 175 feet and two stores high and has been erected at a cost, exclusive of interior equipment, of $400,000.

The ground floor is used as a model room in which are exhibited the large variety of mechanical appliances necessary in connection with our warships. Adjoining the model room is a mechanical laboratory, where among other things is a full size working installation of the "Long-Arm" system of power doors. In this laboratory the midshipmen are given the benefit of practical work in pattern and machine shops, equipped with the best automatic and other tools. Simultaneously, other classes are experimenting in the foundries making castings of both iron and brass. In all, the student at the naval academy is assured of a technical education which, outside of its connection with the specific purpose of the institution, compares favorably with technical instruction in most other schools.

Wallace's Recommendations.—John F. Wallace, formerly chief engineer of the Panama Canal, before the senate committee on interstate canals last week, recommended that the canal be built by contract, preferably by one contract. He urged that the head of the canal work be located on the Isthmus, not at Washington, and advised the creation of an executive committee of three, the principal officer with the highest authority to be on the Isthmus, the second in importance to be governor of the zone, and the third to be in Washington in charge of the purchase of supplies.

FOUNDRY PRACTICE.[1]

BY WM. A. BOLE.[2]

My foundry experience has been confined to the making of engine castings, cylinders, flywheels, valves, and other such castings, both for steam engines and for gas engines, ranging in sizes from small to very large.

Castings of this class are very much machined; they are penetrated by the planer, lathe and drill press, and still they must be steam tight and gas tight after all this is done. Such castings are in distinction to many other classes, where a good, sound outward appearance suffices to obtain acceptance and where this inquisitorial work is unnecessary.

From my general relation to the manufacturing problem, I feel more interested in the ultimate sufficiency of a casting than in the first cost of making it.

It is, of course, common custom to make test specimens attached to, or poured from, the same metal as our large castings, and we are obliged to place reliance upon such test pieces, as they are perhaps the best method of obtaining knowledge which we can employ, but we all know that test bars alone are no sufficient assurance against treacherous castings, and that they do not pretend to reveal such dangers as internal strains in complicated castings, which often have far more to do with the value of the casting than has the quality of iron out of which the casting was poured.

It is of great importance for any man to have a certain repetitive experience which we call specialization, and it is almost equally important to have a fair fund of collateral knowledge in order to supplement the first sort. This will increase his reasoning powers and make him a more active student of cause and effect. The foundryman can very well afford to know some other things besides the daily round of his duties, and I believe that foundrymen nowadays are, as a rule, inquisitive, studious men, who are doing their best to increase their fund of knowledge. Not all men are built this way, however; I remember once having a very competent machinist ask me if wrought iron was made out of cast iron, or if cast iron was made out of wrought iron, and how it was done.

The present day aids to the foundryman are much greater and more extensive than they were some years ago. Engineers are paying closer attention to foundry methods, assisting the foundryman where they are able to do so, and tending to make his work easier and more sure. Formerly there seemed to be a distaste for foundry details, and many a design has been made where the engineer in charge spent much time and labor in going over his drawings, his engineering calculations, and his preliminary estimates, but as for the carrying out of the foundry work, depended wholely and absolutely upon the empirical experience of his foundry foreman, trusting entirely to the judgment of the latter for every move in the carrying out of the work, never going near the foundry himself.

I think too that the advent of the steel casting has had something to do with this change; it has always seemed to me that people engaged in the steel business have been a sort of a brotherhood, willing and anxious to exchange views and to help the other fellow out of a tight place, and this spirit, added to the additional field for the use of the reasoning powers, has tended to make the iron foundry business less of a sealed book than formerly.

There is no possible doubt as to the value of discussions in regard to foundry matters by people who have any experience with the subject, and we, all of us, ought to be of a mind open to conviction and without too much heed for consistency with our past views.

In the conduct of the iron foundry of which I have had charge for some years, I have endeavored to induce as much reasoning and thinking among the foremen as possible, and in order to have some nucleus, or nest egg, around which to gather reflections, I prepared a little treatise some years ago which I called our "foundry primer," being written by an infant for the use of the infant class, and liable to contain some infantile ideas; however, even an infant's mind is better than no mind at all, and it is possible that such a mind may develop into that of a grown adult, and I propose to read to you some extracts for your consideration.

Notes on Foundry Practice.

The following memorandum is intended solely for our own foundry foremen, and is issued with the knowledge that it may be in contradiction to some of your opinions on the subject, in order that such points may be discussed and combatted in the general interest of finally arriving at definite conclusions in regard to foundry practice.

It is more or less beyond dispute that for every sort of defect in iron castings, more than one opinion can be advanced as to the reason, and in complicated cases there are likely to be as many reasons as there are persons. There are many circumstances which can conspire to produce bad results in foundry practice, and there is practically only one way to produce good results, which is by having every feature of our practice perfected. The difference between what will produce a good casting, and what has produced a bad one, is often small, and it is therefore important that no consideration connected with molding or pouring castings should be considered too small to be worthy of the foundryman's consideration.

For the benefit of our own organization, and for no other purpose, the following memorandum is issued:

Use of Scrap.

It is the writer's belief that almost any pig iron is improved by remelting, especially if its sulphur content is low in the first instance. Raw pig iron is likely to be very high in carbon. There are two forms which carbon may assume in iron castings, namely: the graphitic form, in which the carbon separates out from the iron into large flakes like plumbago, and which have the effect of separating the particles of the metal, insulating them from each other, and tending to make the iron soft and weak. The effect of remelting the iron is to reduce the amount of this graphitic carbon. When iron is melted and in the ladle, the carbon in the iron assumes the form of combined carbon, otherwise if it remained in the graphitic form it would float off on top of the iron as slag, being very much lighter than the iron itself. In the act of cooling part of this carbon remains in combination with the iron, and is known then as combined carbon, tending to make the iron hard and white, while the larger portion of it goes back into the graphitic stage, with which appearance you are familiar. The principal difference between iron and steel lies in the fact that steel contains no graphitic carbon, and a rather high percentage of combined carbon, depending upon the purpose for which the steel is intended. It is really the presence of graphitic carbon which makes the pig iron to be iron instead of steel. In an open-hearth steel melting furnace the carbon is burned out, and the iron changes from pig iron into steel. Therefore, each remelting of the pig iron, if it could be done with a fuel containing no sulphur, would be one step toward making steel out of your cast iron.

This tendency of the carbon to become graphitic is useful for some purposes and harmful for others. In fact it might be fair to state that there is no such thing, properly speaking, as impurities in iron,—the sulphur, phosphorus, manganese and silicon, bear

[1]Abstract of a paper read before the Pittsburg Foundrymen's Association, Feb. 5, 1906.
[2]Manager of Works, Westinghouse Machine Co.

about the same relation to pig iron that pepper, salt, mustard and vinegar do to the food we daily eat. Each one of these elements has a certain effect upon the iron, and rightly employed they do good instead of harm. They must, of course, be controlled or there will be bad results, just as though too much salt had been employed in an otherwise very nourishing and palatable dish of food. The tendency of graphitic carbon to form while the iron is cooling makes thin castings soft where otherwise they might be too hard to machine, and if very thin castings are to be poured, such as novelty work and the like, it might be said that the iron could not be too high in graphitic carbon. If this same iron, however, were poured into thick and heavy sections, the result would be carbon flakes so large and so separating the grains of iron one from another, as to make the iron soft and weak, with a tendency to be porous and spongy in the center and unsuitable for any such work as engine work. The remelting of the iron tends to reduce this graphitic carbon and therefore scrap, being remelted iron, is profitably employed where the castings are thick and heavy, in order to close up the grain of the iron and make the metal solid and strong, even where it is quite thick in section. This is equivalent to saying that scrap should be used more carefully and sparingly in thin castings, and used freely and in considerable quantity for large and heavy work, the only danger in the case being that each remelting of the iron is likely to increase the sulphur content. It is not always safe to use too much scrap of unknown character, lest the sulphur run too high. In cases where the castings must be particularly clean, close grained and hard, as for instance, cylinders for steam and gas engines, it will be advantageous to use a very considerable quantity of scrap, and if the gates and sprues and pig bed of the previous heats can be collected and saved for this purpose, the results will be better than though any raw pig is employed. This use of scrap iron should be employed rather to improve the quality of the iron than to simply cheapen the cost. If this improvement in quality is constantly kept in mind, it will lead to scrutinizing the scrap to reject any pieces which are obviously unfit to use, such as burned iron found in grate bars, annealing boxes and the like; all bolts, nuts, or other wrought iron or steel pieces, should be picked out of the scrap pile and not allowed to enter the cupola or air furnace.

Requirements of Castings.

Before any statement can be made in regard to the proper iron to use, the foundryman must know what is the character of the casting which is to be made. Probably no question is more vital than the question of size, that is, its thickness as affecting its rate of cooling. It is an absolute impossibility to find any one iron which is suitable at the same time for very heavy and very light work, and to employ metal from the same ladle with which to pour a casting whose average thickness is 2 inches, and another casting whose average thickness is ¼ inch, is a foundry absurdity, and should be so considered and recognized by the man in charge. The iron which will make the large casting close, solid, strong and reliable, will make the small casting hard and flinty and impossible to machine.

Conversely, the iron which will make the small casting soft and suitable for its purpose, will be likely to make the large casting open, spongy, weak, and with great tendency to shrink in the thick spots, and in general produce bad work. Therefore, the difficulty of running a general foundry, in which both light and heavy work are to be cast on the same day, and out of the same cupola, is very considerable. If the foundryman has nothing but light work to cast, he should use irons which are low in sulphur, fairly high in phosphorus, and high in silicon. These qualities will give him softness, and at the same time sufficient strength for almost all ordinary purposes.

If, on the other hand, the foundryman is making only large and heavy work, where soundness and strength is demanded, he must necessarily employ an iron harder in its quality, and this is to be produced by using metal comparatively low in silicon, lower in phosphorus, and may contain considerably more sulphur than would be permissible in the light castings. This is one of the reasons why foundries running on specialties, have much better results with their castings than general foundries making, or attempting to make, both classes of work. We should, as far as possible, use a different cupola for our light and medium work which we wish to come soft, from that employed for our large and weighty pieces, which require a different metal to be charged in order to meet their peculiar requirements.

Of course the cupola as a melting furnace is capable of being charged with different grades of metal, which may be tapped in the sequence in which it is charged, and a fair approximation may be had to what is wanted, provided the foundry foreman is very careful to stipulate just what he wants charged, and in the proper order, and provided also he taps and and pours this metal in the precise order which he had intended when making up the cupola charge. It is probable, however, that the metals do not all melt in precisely the order in which they are piled in the cupola and certain of the irons may melt too early or too late to take their proper place in the procession of events. In case special iron, either light or heavy, but different from the average iron of the heat, is desired, it is best to charge such special iron on the first coke bed, and pour it off before the general run of the mix is tapped.

If this statement of the difference between requirements for large and small castings is true, it involves a careful separation of such parts and a careful planning on the part of the foundryman as to the order in which his molds will be ready to pour, so that he may put the iron intended, into the mold intended, and not get the wrong iron into the wrong mold. Cupola melted iron is likely to be not thoroughly well mixed, and as an illustration, two or three irons might be melted in the same charge, and might be tapped out into the same ladle, but for want of stirring might be in the same condition as milk newly poured into coffee, that is, there might be a stratification of the various metals, and as the coffee is stirred up with a spoon, so it might be well to stir the iron up vigorously to produce a uniformity and amalgamation of the ingredients which would tend to better results. For important work it is apparent that melting iron in the air furnace is superior to the practice of melting it in the cupola. In the air furnace the iron can be rabbled or stirred, and thus made to thoroughly intermingle, and, in addition to this, the tendency to boil itself, produces a stirring and intermingling of the ingredients, which always results in a stronger and more homogeneous iron. This rabbling, however, should not be done with steel or wrought iron bars, as is often the case. These bars will sluff off, and the wrought iron, having a much higher melting point than the cast iron, will not thoroughly mix with the latter, but is likely to be carried along simply in suspension, or as slag would be carried on the top of the iron, except that in this instance it probably floats with the metal, being of about the same density. It occurs to the writer that the spotted and mottled appearance of many finished castings is due to the fact that a scum of wrought iron from such cause as this has lodged against the wall of the mold and in the finishing has revealed its presence by its different color.

It would seem to be safer practice

to rabble or stir the molten metal in the air furnace by the use of wooden poles or saplings, and these latter, in addition to acting as stirring rods, produce a boiling by the sap or moisture within them, and this boiling gives the iron a chance to thoroughly mix and mingle, and possibly to rid itself of any contained impurities by the agitation.

It would be impossible to use just this same method in cupola melting, but to hold a hickory pole in a ladle of iron being tapped from the cupola ought to produce something of the same results, and the boiling in the ladle would tend not only to stir it well, but to throw off contained gases by bringing them to the surface. The use of small quantities of aluminum, about one pound of aluminum to the ton of iron, has been recommended as a means or producing this same sort of searching out of molten iron. It is alleged that the aluminum has a strong affinity for any contained oxygen in the molten metal,—this oxygen being present in the form of burned iron as the foundryman recognizes it. It is well known to all foundrymen that burned grate bars, and other such iron, when charged into the cupola, are the source of a great deal of trouble, and that while such impurities create a great amount of slag, it is to be feared that part of the evil is taken up by the iron itself, although it may seem to be comparatively clean and free. The aluminum is alleged to have the property of eliminating such contained oxygen, making the castings sounder and more solid. The aluminum is very light and would float on the surface of the metal; it is, therefore, preferable to hold it below the surface of the metal in some way, and allow it to diffuse itself throughout the entire ladle.

In general, it is probably safe to say that cast iron does not permit of softness and strength in the same iron; that softness in cast iron is always accompanied by weakness, and that strength in cast iron is always accompanied by hardness, unless the iron should be so hard as to be chilled in thin sections, and then it becomes brittle and weak from its chilled state.

The following is a table submitted as a statement of opinion of the relation which should exist between the thickness of metal in the body of a casting and the chemical composition of the iron out of which it should be poured:

Size.	Silicon.	Phosphorus.	Manganese.	Sulphur.
¼ in.	3.25	1.00	.40	.025
½ in.	2.75	.80	.40	.040
¾ in.	2.50	.75	50	.050
1 in.	2.00	.70	.60	.060
1½ in.	1.75	.65	.70	.070
2 in.	1.50	.60	.80	.080
2½ in.	1.25	.55	.90	.090
3 in.	1.00	.50	1.00	.100

It is, of course, understood, that this is intended to apply only to our own local practice and to nothing else.

In the case of very small castings, if we calculated their thickness on the basis of the strength of the iron, they would be so thin that the foundry would be taxed to produce them, and generally speaking, small castings are made thicker than considerations of strength demand, simply because this action complies with the foundry requirements better. In the case of very large machinery, however, it is different, and when cylinder walls and other thicknesses run up to 2 inches and 2½ inches, it is because the strength in such castings is demanded by the strain upon them, and it is somewhat unfortunate in fact that these large castings of thick section, by virtue of their slower cooling, cystallize into a larger struct- in the act of cooling, and are not inherently as strong as they would be if poured into lighter molds. Therefore, while it is important in the light work to select iron which is sure to be soft, it is just as important, if not more so, in the large work to select iron which is sure to be strong.

Bad Castings.

If the casting is bad, it may be for any one of several reasons. If it cracks in the cooling, it may be due to the quality of the metal out of which it was poured, or it may be due to the haste with which it was uncovered and exposed to the cold air in cooling. The iron which will make a good casting when slowly cooled, may make a cracked casting if the latter is pulled out of the sand too quickly, and since in our practice we are in the habit of unusual speed in pulling red hot castings out of the sand, it is particularly important that iron should be free from shrinkage tendencies, and therefore should be low in sulphur. It is unquestionably good practice to allow the castings to remain in the sand as long as possible, and if circumstances permit, until they are perfectly cold. Certain castings having unsymmetrical proportions may be aided in the act of cooling by exposing the thick places first, as for instance, in the case of a heavy flywheel with a set of light arms, it will be advantagous to expose the outer portion of the rim and cause the rim to cool and contract more rapidly than otherwise and more nearly in time with the thinner arms.

Certain castings, by virtue of their intended use, are much more critical than others, and the iron which might be good enough for bedplates or engine housings, which do not receive much finish, and which may be cast with the critical side downward, may not be sufficiently good iron for cylinders, in which there is a great amount of finished surface, and which a comparatively small defect will cause to be rejected.

In the case of dirty castings, it may often be the case that the manner of cutting the gates is responsible for the dirtiness. The iron may enter the mold in such a way as to wash away part of the sand mold and the sand thus liberated may fuse with the iron, forming a pasty, sticky mass, and may defy the rules of gravity and not swim to the top of the mold, but adhere to the mold wall tenaciously and allow the molten metal to surround it and pass on over it. This will result in a sandy, spongy spot, which may condemn a large and valuable casting.

It is of the utmost importance, therefore, that the foundry foreman should supervise the method and manner of cutting the gates, and not allow this to be done at the whim of the individual workman. The runner, or entry, by which the metal finds its way into the mold, is exposed to far more severe service than the body of the mold proper. In the case of a large casting it may be that 20 or 30 tons of metal is compelled to run through a narrow passage, something like a hose, and this iron, being fresh from the furnace, and intensely hot, will fuse the sand on the walls of the runner or intake, and if the sand thus fuses, it will form a glassy, pasty composition, which may be dragged along by the stream of metal to lodge some place in the mold, and generally in an important and critical place. It is, therefore, of great importance that the runner or intake should be formed out of the very best sand obtainable, and carefully dried and protected by the best of facing, in order to prevent this action. For such facing, plumbago or graphite is used, because it is almost infusible by heat, beng one of the most difficult materials to melt known to man. If pure plumbago is used as a facing, preferably by swabbing it on in liquid form and then drying, this makes a non-conducting covering, so to speak, protecting the sand against the heat of the iron. For pouring large and critical castings, such as cylinders, we advocate the use of fire-brick runners, in order to prevent the sand from being thus acted upon at this most critical point in the whole mold;—a good fire-brick having a higher resisting power against heat than molding sand,—and if they are protected by a good coating of plumbago facing, they will endure a vast amount of liquid metal pouring over them without giving away to it. It is a universal practice in the making of steel castings, in which the molten metal is very much hotter than any

iron foundry ever experiences, to use special clay runner pipes made especially for this purpose, and for the particular reason that the sand out of which the molds are prepared, is not good enough to stand the onrush of the fresh liquid metal. We have in our own experience evidence to prove the value of making the runners in this very careful way.

As the iron is rising up in the mold, such molds being usually poured from below, the walls of the mold are not exposed to the same furious action as the walls of the runner. The iron does not pass them with the same velocity, and is not of the same intense temperature by the time it reaches the mold proper, and therefore the wall of the runner gets more severe service than the walls of the mold.

There are a great many castings which have what is commonly known as a clean side and a dirty side, that is to say, one side is particular and the other one is not so much so. In consequence, the molder who makes such castings may succeed in making a large number of passable and acceptable castings, and get into the habit of doing work in a certain way calculated to produce results "good enough" for that class of work. The same molder may be taken from such a job and put upon another piece of work which must be clean both in cope and drag, and if he pursues the same line of policy as he has been accustomed to, he may turn out nothing but bad castings. Therefore, it follows that a man skilled in making some one particular kind of work, may, by happy combination of processes, produce good work without really knowing which of the many things involved is accountable for his good results, and he may be put on another job no more critical than the first job, but requiring a little different line of thought, and he may produce bad work.

There are probably few departments of manufacturing in which there is as much chance work and as little absolute and positive knowledge as in the making of iron castings. This will account for the various opinions which are advanced by various experts, each equally competent in his own line, and yet radically differing from each other in his views.

Flasks and Outfit.

The making of large and important iron castings ought to be attempted only after consultation between the foundry foreman who is to prepare the mold, the pattern maker who is to make the pattern, and the mechanical engineer, who ought to be employed to compute the stresses and pressures involved in the pouring of liquid iron, in order to make the rig strong enough without making it excessively weighty and costly. The pattern maker should not attempt to proceed with the making of the pattern until he has consulted with the foundryman who is to do the molding, in order that the pattern may be built on such a plan as to assist the foundryman in his mode of molding. This involves that the pattern maker must know a large amount of details of the foundry in order to cooperate to the best advantage, and the foundryman on the other hand would do well to know something of the art of pattern making, in order that he may not ask for conditions which are antagonistic to good practice in that department.

Patterns must be made to be strong and durable, and free from tendencies to warp and twist out of shape. The pattern maker should be the best judge as to how to construct his pattern and core boxes to take care of this consideration, and it is obvious that each department having certain points it would wish to press, must be willing to give way to good and sufficient reasons on the part of the other. The pressures produced by liquid metal in the molds, and the resulting strains on the parts of the mold, are often tremendous, and they are generally too intricate to be readily calculated by the molder or foundry foreman, because such calculations are more or less out of his line. Therefore, in the designing of flasks and rigging, the work of the mechanical engineer, trained along such lines as this, qualifies him to design bracing, clamping, and other means of strength, to a better and more effective degree than could be done by either the foundry foreman or the pattern maker.

It is, therefore, apparent that a deliberate and judicious consultation among the three such officials should result in the best outfits, and as the security and safety of large molds may depend upon the correct knowledge of the strains involved, and of the strength of parts required, the subject should be viewed from all sides before any move is attempted.

Generally speaking, the foundry foreman and the patternmaker should determine the question of methods of molding, and the engineer should take up the matter at this point and compute thickness of plates, flask walls, bolts, clamps, holding down weights, and other mechanical details, as his training would best qualify him, and such rigging when judiciously made will shorten the work of molding, increase the safety of molding, and insure a perfection of the finished product in a way that should be gratifying to all parties concerned.

If a foundry foreman has due appreciation, therefore, of the requirements of his different classes of work as to metals necessary to produce the best results, if furnished with the metals of suitable qualities for the purpose intended, and pours these metals at proper temperatures, into molds which are properly made and properly braced, and made of the most suitable quality of sand, protected by the best facing, the finished result ought to be a good casting, and one which we may be proud of.

ANNUAL CONVENTION

Of National Supply and Machinery Dealers' Association.

The first convention of the National Supply and Machinery Dealers' Association opened Wednesday, Feb. 14, at Hotel Chamberlain, Fortress Monroe, Va., and will close on Friday. No regular program was prepared for the meetings, the idea of those in charge being to devote the three days to the discussion of those trade topics which appealed to the members present as of chief concern. Practically all of the sessions are executive and the convention is spending no time in social or other diversions, but is tending strictly to the mass of business which has naturally developed at its first national meeting. About 200 are in attendance, representing the eighty firms which are members of the association. A number of manufacturers are present, though no effort was made to secure a large attendance otherwise than to state that any who came would be made welcome. The growth of the association during the nine months of its existence has been extremely rapid, its membership now including more than two-thirds of the eligible and desirable firms in the section which it aims to cover. This has been largely due to the untiring efforts of J. H. Drury, the retiring secretary-treasurer, whose wide acquaintance among machinery and supply men rendered him particularly well fitted for the position.

Edwin Reynolds, the veteran steam engine builder, who is consulting engineer of the Allis-Chalmers Co., of Milwaukee, has just been granted a patent upon the so-called Manhattan type of engine, a horizontal-vertical compound type in which the low pressure cylinder is at right angles to the high pressure cylinder, both working on the same crank. As Mr. Reynolds will be 75 years of age March 23, he thus confounds Dr. Osler and his theory regarding man's usefulness after the age of 60.

PANIC PREVENTED

By the Steel Corporation.—Interview with George W. Perkins.

In an interview with James B. Morrow in the Cleveland *Plain Dealer*, George W. Perkins, chairman of the finance committee of the United States Steel Corporation, said:

"I believe in public ownership—not government ownership—and our greatest industries, except Standard Oil, are so owned. Mr. Carnegie, men in control of the Illinois Steel Co. and others were about to enter upon a war of building new and unnecessary things. Millions of dollars thus would have been taken from profitable and good use. An appalling panic threatened. On the very brink of the battle the men whom I have mentioned came to New York and, throwing their securities on the table before Mr. Morgan, said:

"'There is our property; take it, pay us for it, and run it.' Mr. Morgan accepted that immense and patriotic responsibility. And who bought the new shares? The public. We read today, under a flourish of shouting headlines, that Mr. Morgan, after a desperate encounter, has again obtained control of the United States Steel Corporation. Yesterday we were told in black type that Mr. Rockefeller had gone slyly into Wall street and after a titanic struggle had wrested the company from the avaricious hands of Mr. Morgan. Moonshine from first to last. At no time since its creation has any one man owned more than 250,000 shares of the United States Steel Corporation. And 250,000 shares equals $25,000,000 in a total capitalization of a billion. The people have owned and they do now own the steel company. Furthermore, they own all of the large railways in the country—the Pennsylvania, the New York Central and even the Union Pacific.

"I defend the creation of huge corporations because they are necessary, and for the reason that they offer a solution for several vexatious social problems. But I urge all men of influence to insist upon governmental supervision of the business of large aggregations of capital and upon the widest publicity of their affairs. This done, let the people come in and own everything and let them hold their agents to a strict accountability. Thus every industrious and prudent American could be a capitalist and could safely and profitably invest his money."

"You worked out the plan to sell shares of stock of the United Steel corporation to the employes of that great organization. Has it been successful?"

"Very; workmen of the company now own about $10,000,000 of the stock and many applications for shares are being received in response to our second offer, which was made recently. The public has no conception of the interest which the employes of the company take in its affairs. During the month of December, 160 records were broken at our various works for improved and economical production. Our theory has been that individuality counts in all business undertakings. Therefore, when Mr. Carnegie and others dropped out, we turned to the workmen themselves and invited them to join the partnership. The result has been in the highest degree satisfactory. Our entire organization is alive with vitality, intelligence and invention."

"The defenders of large corporations used to say that trusts, as they are commonly called, prevented panics. Do you hold to that opinion?"

"I do. The United States Steel Corporation stopped a panic late in the year 1902 and early in 1903. We, better than anyone else, perhaps, are in a position to see the first clouds which appear upon the horizon of business. In the closing months of 1902 we saw the gathering tempest. Immediately we reduced our production. We didn't fill every furnace yard in the country with pig iron, nor did we close mills and throw men out of employment; but we did cut our production, somewhat, going about it carefully and keeping our employes busy part of the time. Instead of banks being choked with the paper of a hundred separate establishments they contained $40,000,000 of the money of the United States Steel Corporation, and the money was on deposit in different parts of the country. There were no bankrupt concerns, no idle men, no hungry women and no children were kept from school because of naked backs and feet. Furthermore, in bad times we have refused to reduce the price of steel rails from $28 to $23 a ton and have declined to accept $32 instead of $28 when times were good and demands were pressing. Accordingly, we have steadied the market and made things better on all occasions. I think I have given a fair answer to your question."

THE PUGET SOUND METALS CO.

The Puget Sound Metals Co., recently incorporated, is at present erecting a testing plant on the Ainsworth & Dunn Wharf, Seattle, Wash., where railway and shipping facilities are provided. This is intended principally to show a number of special machines owned by the company in operation before sending them to the mines or to the beaches. The principal product of the company will be iron ore, substantially free from all contaminating substances and supplied to the trade in an agglomerated condition, about eighty-five per cent metallic. The company has purchased machinery which will be capable of working several hundred tons of ores or sands each twenty-four hours. Most of this has already been shipped and it is expected that operations on ores from British Columbia and Alaska will be begun within a month. The process is designed for the separation of all magnetic materials from ores and beach sand, for the classification and separation of all other materials in the pulverized ores, such as chromite, garnetite, zircon, monazite, etc., and finally the saving of gold, platinum and other valuable metals after the pulverized ores have been worked over. The officers of the company are: W. B. Moore, Walla Walla, Wash., president; W. H. Adams, 18 Broadway, N. Y., secretary and general manager; and Ben C. Holt, Walla Walla, vice president.

ONE HUNDRED YEARS AGO.

From a quaint little volume which styles itself "An Easy Introduction to the Arts and Sciences," published in London in 1802 is taken the following description of iron:

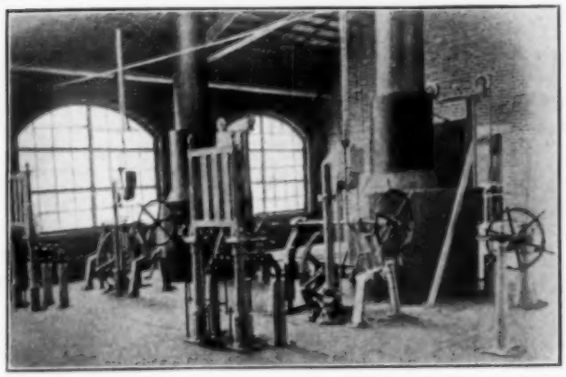
"Iron is a hard, dry, fusible and ductile metal, consisting of earth, salt and sulphur, but all impure, ill-mixed and ill-digested, which renders it liable to rust. By often heating it in the fire, hammering it, and letting it cool by itself, it is softened; by extinguishing it when hot in water, it is hardened. There are a great number of iron works in England; but the most considerable are those in the forest of Dean, in Gloucestershire, where the ore is found in great abundance. Though iron is the cheapest, it is certainly the most useful of all kinds of metal, and seems indespensably necessary to the carrying on of every art and manufacture. Nay it appears to be the great means of polishing and civilizing mankind; at least much more so than the more precious metals. There have been instances of nations possessed of great quantity of gold, and who yet remained in a state of barbarism; that, it is well known, was the case with the Americans upon the first discovery of their country by Columbus; but there never yet was an instance of a nation, who understood the art of making or manufacturing iron, but what attained, in time, to at least some degree of civilization."

There are many favorable places in New South Wales for the utilization of windmills, oil engines, and steam pumps as irrigation is a growing factor.

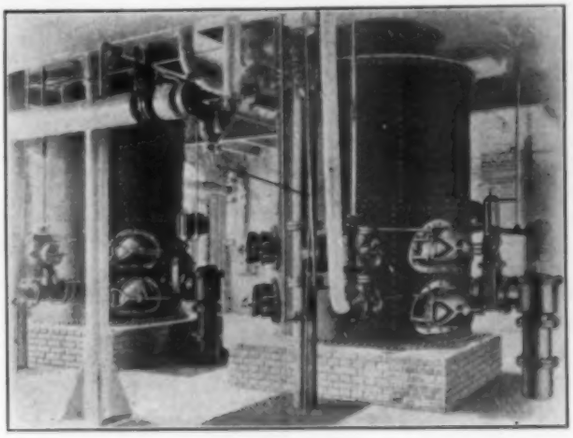
A NEW TYPE OF WATER GAS PRODUCER.

Water gas has been used for a number of years in the most prominent iron and machine works of England and Germany, showing a high economy over the use of coke or illuminating gas, which was formerly used. Many of the firms utilize the newest German type of water gas producers, which, it is stated, gives a far greater yield of gas, than can be obtained with the ordinary process.

Water gas is made by alternately blowing steam and air through an incandescent bed of coke. The air is first blown through, this period being known as hot blowing, and renders the coke sufficiently hot to decompose the steam, which is next blown through. The steam is decomposed into oxygen and hydrogen, the former combining with the carbon of the coke to produce carbon-monoxide. The decomposition of the steam absorbs heat, so that, after a certain length of time, the coke bed becomes so cooled as to be unable to decompose the steam. In an efficient water gas process, the time required to blow air through the bed is reduced to a minimum.



WORKING FLOOR OF PRODUCER PLANT.



LOWER FLOOR OF PRODUCER PLANT.

In the older types of producers, a high layer of fuel is used, and a low air pressure is applied. This system produces gas for about five minutes, and blowing for same length of time is required to bring the coke to an incandescent state.

The product of combustion during the hot blowing period is a low grade of gas, which is usually wasted, and can be utilized only under certain conditions. The problem to be solved, was to generate, during the hot blowing period, a gas practically free of carbon-monoxide, and high in carbon-dioxide. By burning to dioxide, in a given time, four times the heat will be generated as by burning to monoxide. This result has been accomplished in Germany, by using a low layer of fuel, and high pressure blast. In these plants gas is made for eight minutes, and air is blown for one minute. The yield is largely increased, as compared with the old type, being 35 to 40 cubic feet of gas of 275 to 285 B. T. U. per pound of coke.

By decreasing the period of hot blowing, a small holder is required to contain sufficient gas for use during the hot blowing period.

The working of the generator is as follows:

A cylindrical shell, lined with fire brick, and provided with the necessary valves for the entrance of air, is filled with coke to a certain height, and blown hot by means of a positive blower. During this period, the air inlet valve, and the charging door are open, and the gas valves are closed. The air enters under the grate, and goes through the fuel to the stack. When the generator is sufficiently hot, the air inlet, and the charging door are closed, and, at the same time, the upper and lower gas valves are opened, depending upon the point at which the gas is to leave the generator. The steam is then blown into the fuel until the gas becomes inferior, which can be seen from a test flame.

When the quality of the gas deteriorates, the steam valve is closed, the air valve and the charging door opened, the gas outlet closed and the blower started.

Steam is blown in from the top and from the bottom, making the distribution of the heat in the generator more uniform. Fuel is charged through the charging door, after three periods of gas making. Tight doors are provided in the generator through which the clinkers and ashes are removed.

The air and gas valves are interlocked, so that they cannot be opened at the same time. The generator and all valves work from a platform.

Water gas plates of this type are built in the United States by Dr. Oskar Nagel, 90 Wall street, New York.

TECHNICAL OVER-TRAINING.

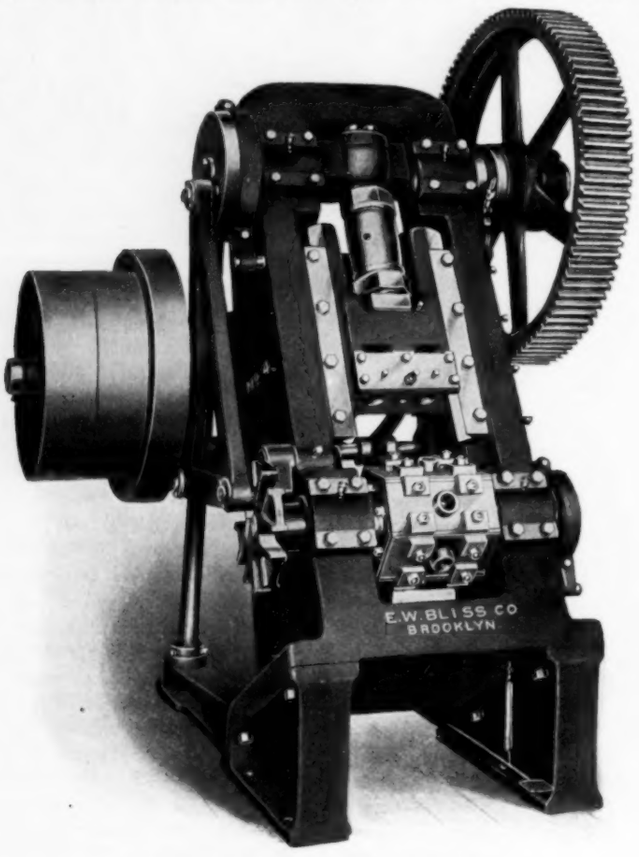
Consul Harris of Mannheim, Germany, states that the German Empire is rapidly building up a class of men for whom it has no employment at fair wages, and for whom the demand does not increase as fast as the supply. He cites the opinion of a writer in a leading paper of Mannheim to the effect that technical education in the empire has been carried far beyond the power to utilize it. The question was brought under discussion by the proposition to erect a school for the building trades in Mannheim. The writer, a prominent constructing engineer, contributed the article which aimed to show that technical training in that country had gone beyond actual needs. He contrasted the number of those studying the technical trades with the number preparing for other professions, showing that in 15 years the former had increased about 200 per cent, while in medicine, theology and some other lines the number actually decreased.

"From this and other present conditions," the writer stated, "it is apparent that the increase in numbers in the technical ranks has gone far beyond the demand—200 per cent against about 50 per cent on the average. The consequence of this overproduction in technical resources is a constantly diminishing rate of wages, as the law of supply and demand applies here as elsewhere. Wage statistics, which were compiled from inquiries made of 20,000 members of the German technical association and which were presented in the Reichstag by Dr. Heinz Potthoff, a member, show the following picture: Almost one-fourth of all city and other trained appointees receive a salary under 1,800 marks ($428.40) per year, 35 per cent receive from 1,800 to 2,400 marks ($428.40 to $571.20), only 24 per cent receive from 2,400 to 3,000 marks ($571.20 to $714), and only 19 per cent receive over 3,000 marks ($714)."

THE BLISS BOLT-HEAD TRIMMING PRESS.

The E. W. Bliss Co., 8 Adams St., Brooklyn, N. Y., has brought out the bolt-head trimming press shown in the accompanying illustration. The common procedure followed in the manufacture of small and medium bolt blanks is that they are forged generally with round solid heads which are afterward trimmed in a die to the desired size and shape. This permits the use of plain, inexpensive dies that are easily made and repaired. The press here described has been especially designed for this class of work. It is set on inclined legs, and has a horizontal six sided revolving die holder, actuated by a Geneva stop motion. There is an automatic knockout in the slide, and a cam actuated knockout in the die holder. Accurate alignment of the punches and dies is secured by means of a hardened tool steel pilot pin in the slide which enters a tool steel bushing in the die holder.

The press is built in four sizes, the largest of which is shown here. It will trim two bolts at the same time, of a maximum size ⅝ by three inches, and bolt heads 1 1-6 inch square by ⅝ inch thickness. The only limit to the speed of the press is the expertness of the operator in feeding it. He is only required to drop the bolts into the dies, after which they are automatically carried under the punches, and are then discharged as the dial continues to revolve. It is never necessary for the operator to put his hands under the punches, thereby removing the danger of cutting off fingers.

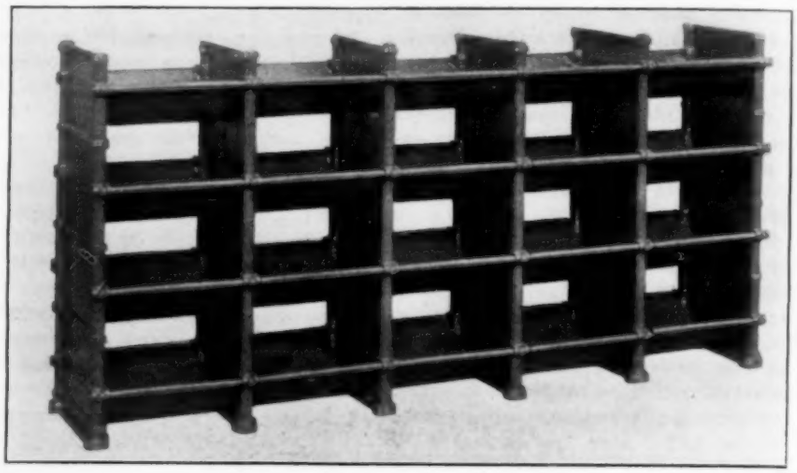


BLISS BOLT-HEAD TRIMMING PRESS.

Inquiry for Sawyer Separator.—A correspondent wishes to obtain information regarding the Sawyer metallic separator, including where and by whom it is manufactured.

A HANDY RACK FOR SMALL MATERIALS.

An extremely handy rack for tool room or store room purposes for taking care of bolts, nuts, screws, small tools, etc., has been devised by the Pawling & Harnischfeger Co., Milwaukee, and is in use in their shops. It is constructed of lengths of pipes and sheet iron plates, the latter being in two forms, one a straight piece and the other a shallow trough. The construction is very clearly shown in the illustration which is a photograph of one in the store rooms of the Pawling & Harnischfeger Co. The frame work of the rack is constructed of long vertical pipes to which are fastened clips at regular distances. A rod is put through each row of clips on each side of the rack and a number of the trough plates are suspended from these rods. The straight plates are inserted vertically between each set of upright pipes, thus making divisions for the various materials. The system can be conveniently extended both vertically and horizontally and is light, accessible and fire proof.



RACK FOR STORAGE OF SMALL MATERIALS.

A 2½-FOOT ARM AND PLAIN RADIAL DRILL.

The American Tool Works Co., Cincinnati, Ohio, has developed a 2½-foot plain radial drill, which is illustrated herewith.

This machine is built with either cone pulley or speed box drive. It will drill to the center of a circle outside the column 5 feet 2 inches diameter. The greatest distance from the spindle to the base is 4 feet 3 inches. The traverse of the spindle is 10 inches, while the traverse of the head on the drill arm is 22¼ inches. This type of tool is also made with 3-foot and 3½-

foot arms. The column is of the round type.

The feeding mechanism on the head provides four distinct rates of feed, covering a carefully chosen range, in geometrical progression, from 0.0069 inch to 0.0203 inch. These are all obtained by moving the sliding key of the feed device until the desired feed is secured. Gears instead of belts insure rapidity of change, and positive action. The feeds operate through a friction which permits a drill being driven to the limit without strain to the feed mechanism.

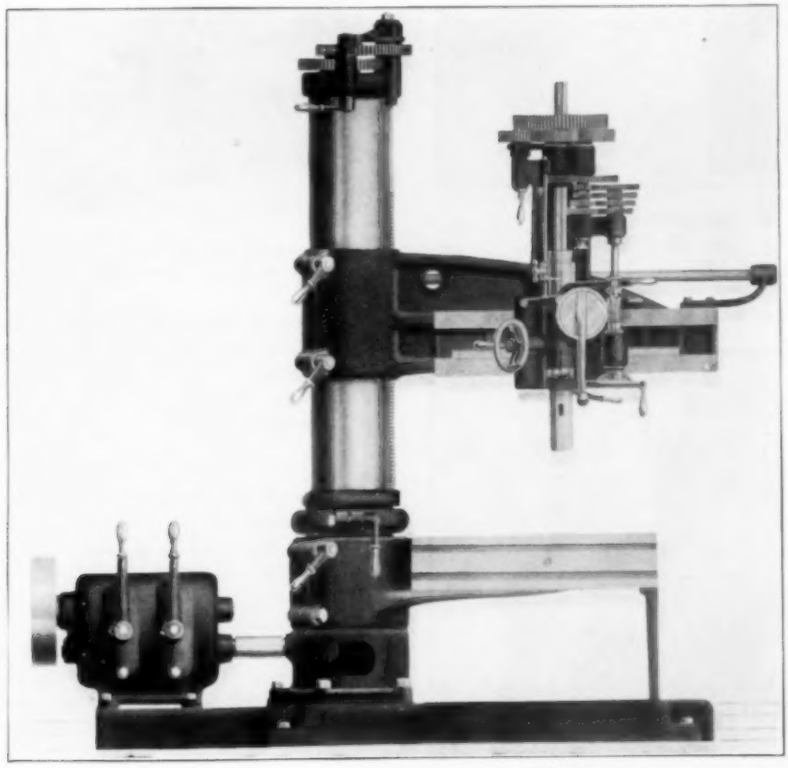
An adjustable trip dog and pointer, acting on the worm clutch can be used to automatically trip the feed at any position of the spindle. This latter has depth graduations engraved upon it, and all depths can be read from zero. Two or more dogs are provided, by means of which it is possible to counterbore any number of holes without resetting. In case the spindle runs down to its full depth, the trip acts automatically thus preventing the breakage of the feed mechanism.

The speed box is of the geared friction type, and provides four changes of speed. Any one of these is instantly available, by means of the two levers shown. The frictions are very powerful, and few parts are employed in their construction. They are made so large as to be free from slippage under the severest cuts. The speed box can be easily interchanged with a cone, by breaking the coupling connection on the lower driving shaft of the drill, the base being drilled and tapped for either form of drive. The spindle has eight speed changes, ranging from 37 to 295 in geometrical progression.

The column is of the double tubular type. The sleeve or outer column revolves around a central column, and is clamped in any position by a V clamping ring, making the outer and inner columns practically integral.

The arm is of parabolic beam and tube section, and is designed so as to leave the lower line parallel with the base. This permits work to be operated upon in close proximity to the column, and eliminates the necessity of an extreme reach of spindle.

The tapping mechanism is carried on the head, between the back gears and speed box, thus giving to the frictions the benefit of the back gear ratio. This makes unusually heavy tapping operations possible, and also permits the taps to be backed out at an accelerated speed.



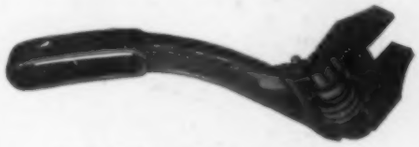
NEW "AMERICAN" RADIAL DRILL.

The National Machine Tool Builders' Assocation will hold its semi-annual meeting at Atlantic City, beginning either April 6 or 16, according to the convenience of the members, a matter which President Woodward is now looking up. Hotel accommodations are also being arranged for.

ELLIS ADJUSTABLE "S" WRENCH.

The accompanying illustrations show the Ellis adjustable offset "S" wrench, recently placed on the market by Patterson, Gottfried & Hunter, Limited, New York City.

This wrench is an improvement on the old style adjustable "S" wrench, in that the jaws are so hinged that they can be thrown to the right or left and



ELLIS "S" WRENCH, OFFSET.

locked in either position. Especial attention is called to the shape of the jaws, which are carefully designed, so as to give the greatest strength without being too large to work in confined places. Fig. 1 shows the wrench with jaws offset to the left. The method of securing the jaws to the right, or left, or straight ahead, is clearly indicated in the cut, and no further explanation

ELLIS "S" WRENCH WITH PIPE JAW.

is necessary. Fig. 2 shows the wrench with a pipe jaw inserted, thus making a handy pipe wrench, and doing away with the delay and inconvenience of changing wrenches. It will work around corners, behind pipe, and in all sorts of inaccessible places, where an escpecially made wrench would otherwise be necessary. It is made in four sizes varying from 6 to 18 inches in length.

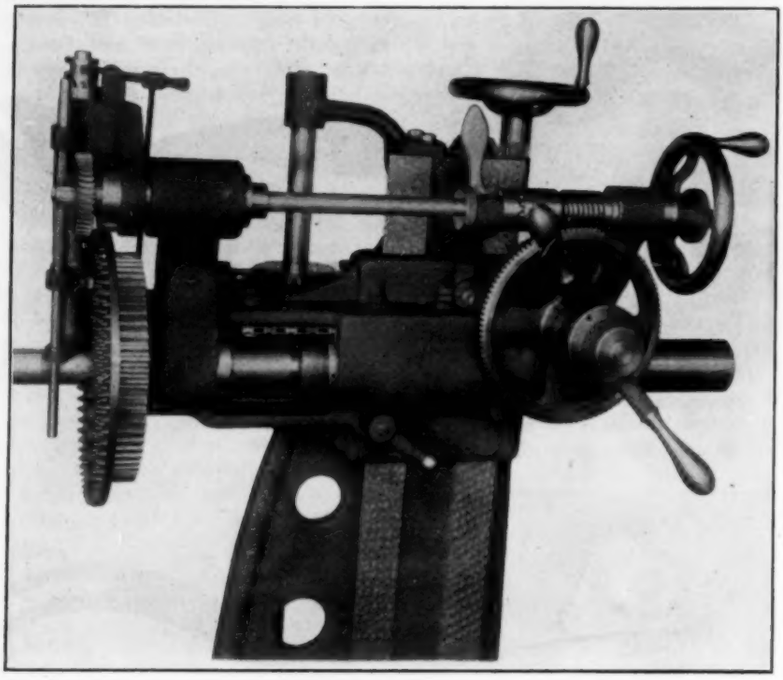
A NEW AUTOMATIC FEED FOR RADIAL DRILLS.

The Mueller Machine Tool Co., Cincinnati, manufactures the automatic feed for radial drills which is illustrated herewith. The use of drills and reamers, constructed of high speed steel demands a positive feed. For certain kind of work this is a detriment. The Mueller company has therefore designed this combination feed, which enables the operator to use either positive or friction feed.

The mechanism is as follows: A round plate having seven circles of steel pins is above the spindle gear. These pins engage with an involute steel pinion on the horizontal worm, its speed being varied by the knob shown below the lower wheel. This knob is fastened to a rod which extends through the center of the vertical feed

shaft, which has teeth cut in the upper end. These engage with a sliding rack and hold the steel pinion in any desired circle for fast or slow speed. Any change of speed desired can be made quickly while the machine is running.

The upper worm wheel has a split hub, and by means of a ring nut can be locked to the vertical feed shaft for positive feed, or slightly released if friction feed is desired. By disengaging a clutch in the end of the horizontal feed shaft, the automatic feed can be tripped, as the upper worm then ceases to revolve.



NEW FEED FOR RADIAL DRILL.

A LARGE HORIZONTAL SPINDLE MILLING MACHINE.

The accompanying illustrations show a 36-inch by 12-foot removable housing, horizontal spindle milling machine, recently built by The Ingersoll Milling Machine Co., Rockford, Ill. The table of this machine is 36 inches wide and 12 feet long between the pockets, and an oil trough is cast on each side of the table The tool is positively reversible, fed in either direction as high as 10 inches per minute, and power quick adjustment is provided for the spindle. The main housing is 19 inches wide on the face. The saddle on this housing carries all of the driving gears and is provided with a vertical feed. It is counter-balanced, thus facilitating the raising and lowering by hand. A horizontal feed is provided for the spindle, so that the machine may be used for boring. The driving gears are all cut from steel castings and are encased and run in grease. The machine is adapted for milling locomotive rods, driving boxes, shoes, wedges and a large variety of other work. One of this type has recently been set up in the shops of the Chicago & Erie Railroad at Hornellsville, N. Y. Fig. 1 illustrates the machine with one housing removed, and a 19-inch face mill in the spindle. A cut was taken across the housing casting on the machine ¼-inch deep at a speed 10 inches per minute. Fig. 2 illustrates machine as set up for horizontal milling. This is the position in which it would be used for working on locomotive rods.

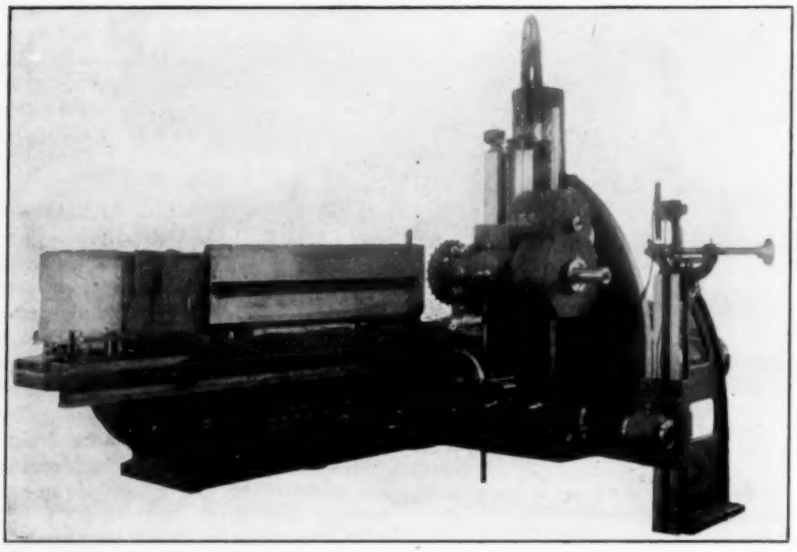


FIG. 1.—INGERSOLL HORIZONTAL SPINDLE MILLING MACHINE WITH HOUSING REMOVED.

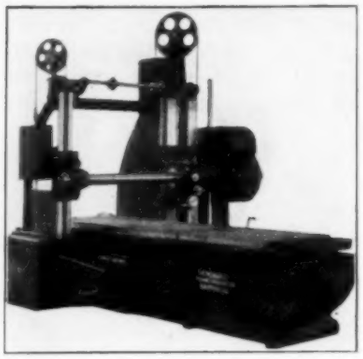


FIG. 2.—INGERSOLL HORIZONTAL SPINDLE MILLING MACHINE.

Will Build Addition.—The Independent Pneumatic Tool Co., Chicago, has leased a large building adjoining its plant at Aurora, Ill., and will at once purchase $50,000 worth of machinery for installation therein. Both foreign and domestic business of the company has increased at such a rapid rate that the plant has proven entirely inadequate to meet the demand for "Thor" pneumatic tools, and, despite the fact that day and night shifts have been run, it is several months behind in its orders. A large addition to the works at Aurora will be erected in the near future. Among recent orders reported is one by cable from a customer in London, Eng., for 300 "Thor" piston air drills, reversible flue rolling, reaming tapping and wood boring machines, and pneumatic riveting, chipping, calking and beading hammers. The same company three months ago placed an order for 200 "Thor" pneumatic tools.

Pronounced Lull in the Stock Market.

After a long stretch of almost feverish activity, the stock market last week experienced a decided lull, with trading generally light and sluggish and total sales only a little in excess of the 5,000,000 mark. The range of prices continued practically the same, although a number of western railway stocks, notably Northern Pacific, Great Northern and Chicago & Northwestern which monopolized attention, recorded substantial advances. About one-seventh of the week's trading was in Union Pacific, transactions in which amounted to 725,000 shares; Amalgamated Copper sold 609,000 shares and Steel common dealings amounted to 608,900 shares, with the preferred adding 121,200 shares. Reading was also extremely active, with slightly over 500,000 shares, but other securities, particularly in the iron, steel and manufacturing line, were given comparatively little consideration. The railway securities especially seemed remarkably well fortified against a number of developments which naturally would be regarded as exerting a weakening influence. Radical legislation in Ohio declaring the two-cent fare the minimum, the beginning of a congressional investigation of the Pennsylvania's affairs, with the Senate threatening to take a hand in case the house did not cover the field thoroughly, and the almost unanimous passage by the lower branch of Congress of a rate bill, apparently counted for nothing so far as current prices on the stock exchanges were concerned. Neither did the threatened coal strike have any pronounced effect on either coal or railway securities in the way of lowering the price level, though its influence was doubtless more accurately shown in the diminished trading of the week, the uncertainty of what is to come on April 1 proving a strong deterrent factor in checking the speculative element.

FINANCIAL NOTES.

F. H. Clergue, of the Lake Superior Corporation, states that net earnings of the company are now more than twice the $500,000 required to pay the interest on the bond issue of $10,000,000. The government of Ontario is soon to be relieved of its guarantee of the $2,000,000 loan.

January earnings of the Steel Corporation are reliably reported to have been practically the same as those of December last, about $11,050,000. This is more than $3,000,000 in excess of the earnings of any previous January.

Dividends recently declared include the following: Niles-Bement-Pond Co., regular quarterly, 1½ per cent on preferred, payable Feb. 15, and 1½ per cent on common, payable March 20 with a similar common dividend payable June 20; the Pratt & Whitney Co., regular quarterly, 1½ cent on preferred, payable Feb. 15.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Feb. 3	Closing Quotation Feb. 10	Changes	Date of 1906 Ann. Meet.	Par Value	Capital Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Dec.
Allis-Chalmers Co	24	24	.....	Sept.	100	19,820,000	7 cum	.....	....
Allis-Chalmers preferred	63	63⅛	+ ⅛		100	16,150,000		.....	Feb., 1904
AmericanCan	10⅝	10	— ⅝	Apr. 24	100	41,233,300	7 cum	.....	....
AmericanCan preferred	70¾	69¾	—1		100	41,233,300		5 Q.	Jan.., 1906
AmericanCar and Foundry	44¼	44½	+ ¼	June 28	100	30,000,000	7 n. c.	.....	May, 1905
AmericanCar and Foundry preferred	103	103	.....		100	30,000,000		7 Q.	Jan., 1906
AmericanLocomotive	74⅜	75¾	+ ⅜	Oct. 16	100	25,000,000	7 cum	.....	
AmericanLocomotive preferred	117	116½	— ½		100	24,100,000	4	7 Q.	Jan., 1906
American Shipbuilding	57	57⅛	+ ⅛	Oct. 2	100	7,600,000	7 n. c.	4 Q.	Dec., 1905
American Shipbuilding preferred	104½	107	+2½		100	7,900,000		7 Q.	Jan., 1906
American Steel Foundries	113	127⅛	— ⅛	Oct. 3	100	17,700,000	6 cum	.....	
American Steel Foundries preferred	49	49½	+ ½		100	17,700,000		.....	Aug., 1905
Barney & Smith	20	25	+5	June 5	100	1,000,000	8 cum	.....	June,1894
Barney & Smith preferred	22	126	+4		100	2,500,000		8 Q.	Dec., 1906
Bethlehem Steel	135	32	—3	April 3	100	15,000,000	7 n. c.	.....	
Bethlehem Steel preferred	93⅛	91	—1½		100	15,000,000	6	7 Q.	Feb., 1906
Bullock Electric preferred	114	114	.....	Oct. 2	100	1,000,000	6	6 Q.	Jan., 1906
Cambria Steel	35⅜	36¾	—1⅜	March 20	50	45,000,000	4	3 S. A.	Feb., 1906
Cambria Iron	49½	49½	.....		50	8,468,000	7	4 S. A.	Jan., 1906
Colorado Fuel & Iron	72	72	.....	Oct. 15	100	30,132,000	5	.....	Apr.,1902
Wm. Cramp & Sons Ship & Eng. Bldg. Co.	28	25	—3	May 21	100	6,098,000		.....	Nov.,1902
Crucible Steel	16⅝	16¾	+ ⅛	Oct. 17	100	25,000,000	7 cum	.....	
Crucible Steel preferred	79¾	79¾	.....		100	25,000,000		.....	Sept. 1903
Empire Steel	6	7½	+1½	Feb. 28	100	2,281,400	6 cum	.....	
Empire Steel preferred	36	37	+1		100	2,500,000	5	3 S. A.	Jan., 1905
Fay & Egan	95	95	.....	Feb. 20	100	1,000,000	7 cum	5 Q.	Nov.,1905
Fay & Egan preferred	120	120	.....		100	1,000,000	8	7 Q.	Nov.,1905
General Electric	175¼	175	— ¼	May 8	100	48,256,050		8 Q.	Jan., 1906
International Pump	36½	35⅜	—1⅛	June 5	100	12,382,500	6 cum	2	July, 1905
International Pump preferred	84	83½	— ½		100	8,850,000		6 Q.	Feb., 1906
Lackawanna Steel	81	81	.....	March 14	100	34,971,400		.....	
Lake Superior Corporation	21½	20½	—1	Oct. 3	100	40,000,000	6	.....	
Niles-Bement-Pond	121	121	.....	Feb. 7	100	5,000,000	6 cum	6 Q.	Feb., 1906
Niles-Bement-Pond preferred	103⅜	103⅜	.....		100	2,000,000		6 Q.	Mch., 1906
Otis Elevator Co	59	58	—1	March 19	100	6,350,300	6 n. c.	2 A.	Apr., 1905
Otis Elevator Co. preferred	104	106	+2		100	5,589,500		6 Q.	Jan., 1906
Pittsburg Coal Co	16⅛	16	— ⅛	Feb. 12	100	30,135,000	7	.....	
Pittsburg Coal preferred	58	58	.....		100	30,716,200		.....	Apr., 1905
Pressed Steel Car	160¾	62½	+1⅝	Feb. 21	100	12,500,000	7 n. c.	3	Aug., 1904
Pressed Steel Car preferred	102¼	102⅜	+ ⅜		100	12,500,000		7 Q.	Feb., 1906
Pullman Palace Car	245	240	—5	Oct. 18	100	74,000,000		8 Q.	Feb., 1906
Railway Steel Spring	60¾	60¼	— ½	March 1	100	13,500,000	7 cum	4 S. A.	Oct., 1905
Railway Steel Spring preferred	106¼	106	— ¼		100	13,500 000		7 Q.	Dec., 1905
Republic Iron & Steel	34¾	35	+ ¼	Oct. 17	100	27,352,000	7 cum	.....	
Republic Iron & Steel preferred	107⅜	107¾	+ ⅛		100	20 852,000	5	7 Q.	Apr., 1906
Sloss-Sheffield	89	89	.....	March 14	100	7,500,000	7 n. c.	5	Jan., 1906
Sloss Sheffield preferred	109	108	—1		100	6,700,000		7 Q.	Jan., 1906
Tennessee Coal & Iron	156	157	+1	May 15	100	22,552,800		4 Q.	Jan., 1906
U. S. Cast Iron Pipe & Foundry	49¼	49	— ½	June 27	100	12,500,000	7 n. c.	2	Jan., 1906
U. S. Cast Iron Pipe & Foundry preferred	95	94¼	— ¾		100	12,500,000		7	Feb., 1906
U. S. Steel	44⅜	44⅝	+ ¼	April 16	100	508,302,500	7 cum	.....	Dec., 1903
U. S. Steel preferred	111⅝	109½	—2⅛		100	360,281,100	5	7 Q.	Feb., 1905
U. S. Steel 5's	99¼	99¼	— ⅛		100	463,798,000		5 A.	
Virginia Iron, Coal & Coke	53¾	53½	— ¼	Sept. 18	100	8,641,600	10	.....	
Westinghouse Electric	166½	165	—1½	June 27	50	20,996,350	20	10 Q.	Jan., 1906
Westinghouse Air Brake	154½	156	+1½	Oct. 2	50	10,990,450		20 Q.	Jan., 1906

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Harbor Iron Works, Long Beach, Cal., has been incorporated for $300,000 with the following directors; J. De Meulle, E. P. Dewey, W. A. Foster, Frank McCutcheon and F. D. R. Moote, all of Long Beach.

The Hndson River Dock & Dredging Co., Syracuse, N. Y., has been incorporated for $25,000 to carry on dredging, contracting and work on docks. The incorporators are Ambrose C. and Helen T. Driscoll, of Syracuse, and George E. Thurston, of Alder Creek, N. Y.

The Brookville Bridge Co., Brookville, Montgomery, Co., O., has been incorporated for $50,000 by Herman D. Fox, S. H. Carr, D. W. Allaman, A. S. Fox and W. C. Kennedy.

The stockholders of the American Steel Package Co., Defiance, O., have voted to increase the capital stock from $150,000 to $250,000. The company manufactures steel kegs, cases, etc.

The Fairbanks Steam Shovel Co., Marion, O., has been incorporated for $200,000 by J. G. Fairbanks, R. C. McColum, George B. Scofield, P. Kelly and Charles W. Fairbanks.

The Indiana Steel Co., Hammond, Ind., has incorporated with a capitalization of $100,000 to smelt iron, manufacture iron articles and conduct a mining business. The incorporators are E. J. Buffingham, George G. Thorp and K. K. Knapp.

The Edmandson Concrete Machinery Co., South Bend, Ind., has been incorporated for $50,000 to manufacture concrete block machines by Robert Edmandson, R. C. Railsback and Joseph H. Wiley.

Hall & Hurlbert, Brooklyn, N. Y., has been incorporated to conduct an iron working and boiler making business with a capital of $50,000. The incorporators are: Alfred Hall, 1526 47th street, John F. Hurlbert, 669 E. Second street and L. C. Valentine Jr., 440 57th street, all of Brooklyn.

The American Cableway Co., Fall River, Mass., has incorporated with $125,000 capital to deal in cranes, hoists, etc. The officers are: J. T. Fyans, president, and T. F. Monaghan, treasurer and clerk, both of Fall River.

The American Foundry Co., South Framingham, Mass., has been incorporated with a $10,000 capitalization to conduct a foundry business. T. J. Cahill is president, T. F. Raymond treasurer and R. M. Raymond clerk, all of South Framingham.

The A. W. Wheaton Brass Works, 142 Market street, Newark, N. J., has incorporated with $100,000 capitalization, to deal in iron, steel, brass and other metals and to manufacture castings and fittings. Abram W. Wheaton, 902 S. 17th street, New York, is at the head of the new company.

The Brand & Silverstein Iron Works, New York, has incorporated for $6,000 to manufacture iron for buildings. Aaron Brand, 64 E. 100th street, New York, is interested.

The Heil Co., Milwaukee, Wis., has incorporated to conduct a structural iron business on a capitalization of $20,000. The incorporators are Gustav Wallaeger Jr., James A. Sheridanz and William Ewig.

The Goodnow & Blake Mfg. Co., 46 Porter street, Detroit, Mich., has incorporated for $5,000 to succeed to the business of Smedley & Blake, manufacturers of sheet metal goods. The incorporators are Wm. M. Blake, Geo. J. Korte, H. C. Gressman and E. B. Goodnow.

The Demarest Bros. Co., Main street, Closter, N. J., has been incorporated with a capital stock of $10,000 to deal in foundry supplies, etc. The incorporators are: Jacob J. Abraham, George W. Demarest and Edwin Du Rie, all of the above address.

The Thomas X. Lieb Brass Works, Brooklyn, has been incorporated with a capital stock of $4,000 to manufacture engines, machinery, tools, etc. The incorporators are: Charles P. Scott, 408 West 150th street; Thomas X. Lieb, 614 Marcy avenue, and William B. Farrell, 550 West 140th street, all of New York.

The D. Holland Iron Co., New York, has been chartered to manufacture iron, steel, and other metals. The capital stock is $3,000, and the incorporators are: Samuel Rosenstock, 576 Seventh avenue; John M. Halper, 1297 Amsterdam avenue; Henry Blumenthal, 109 Ridge street, New York; Morris Berlin, 1712 Bathgate avenue, The Bronx.

The Chemical Light, Heat & Power Co., New York, has been incorporated with a capital stock of $1,000,000 to recover by-products from coal and gas. The incorporators are: F. A. McVay, Sewickly, Pa.; J. Francis Horton, Pittsburg, Pa.; Joseph P. Rankin, Sewickly, Pa.; David Campbell, Beaver Falls, Pa., and C. L. Straub, New York.

J. P. Devine Co., Buffalo, N. Y., chartered with a capitalization of $100,000, will manufacture machinery, boilers, engines, etc. The incorporators are Joseph P. Davis, William Strohm, William P. Kamps, Sidney A. Benedict and Herbert P. Bissel, all of Buffalo.

The Ducro Manufacturing Co., Buffalo, N. Y., has been incorporated to manufacture motors, boats, machinery, etc. The capitalization is $5,000, and the incorporators are Louis C. Ducro, Charles Jempson, and Emma S. Ducro, all of Buffalo.

G. A. Suter & Co., New York, has been incorporated to manufacture and install steam power, heating and ventilating apparatus. The capital stock is $100,000, and the incorporators are: George A. Suter, Frank T. Chapman, John E. Jeffrey, 112 Wooster street; Freeman C. Griswold and Herbert A. St. George, 41 Park Row, all of New York.

The Wheless Marine Engineering Co., New York, incorporated with a capital stock of $100,000, will manufacture boats, machinery, etc. The incorporators are: Thomas H. Wheless, Newark, N. J.; Herman A. Metz, 253 Clinton avenue, Brooklyn, and George W. J. Angell, 12 Fifth avenue, New York.

The Horton Boats, Inc., Rochester, N. Y., has been incorporated to manufacture marine and stationary engines, boats and engine supplies. The capitalization is $1,000 and the incorporators are: L. La Verne Horton, Lena B. Horton and Melvin A. Brush, all of Rochester, N. Y.

The Cyclone Drill Co., Orrville, O., was incorporated Jan. 22, with a capital of $100,000, buying out the assets, including machinery, merchandise, patents, etc., of the Cyclone Drilling Machinery Co., and the Preslar-Crawley Mfg. Co. The new company will make drills of all types and also a combination drill embodying the hollow rod, cable and core drills. Considerable new equipment will be needed in the near future. The directors of the company are: B. S. Cope, president; Chris. Smith, vice president; Wm. H. Tschantz, treasurer, Wm. M. Knoppes, secretary, and Walter A. Knight.

Curtiss, Randall & Co., Champaign, Ill., have organized to conduct a general machine shop and foundry business. The members of the new company are A. R. Curtiss and B. T. Randall. Operations were commenced Feb. 1, in the property purchased from the Champaign Machine & Supply Co.

The Springfield Harrow Co., Springfield, Ill., has been incorporated for the purpose of manufacturng a special riding harrow and other machinery. The daily output of the company at present will be 50 machines, but it is hoped to increase the number to 150 within a year. Charles E. Wyatt is president.

The Gillie Engine & Construction Co., Tonawanda, N. Y., has been chartered to manufacture machinery, tools, etc. The capitalization is $75,000, and the incorporators are: Jacob H. Rumbold and John B. Gillie, both of North Tonawanda, and Frank F. Smith, of Tonawanda, N. Y.

The Mack Bros. Mfg. Co., Brooklyn, N. Y., has been incorporated with a capital stock of $300,000 for the purpose of manufacturing motors, engines, machinery, etc. The incorporators are: Otto Meais, Denver, Col.; Augustus F. and William C. Mack, both of Brooklyn, N. Y.

The MacCordy Mfg. Co., of Amsterdam, N. Y., will manufacture machines and machinery. The capital stock is $20,000, and the incorporators are: Samuel P. MacCordy, Patrick Mitchell, James W. Ferguson, Henry Weidenhammer and Edward Mitchell, all of Amsterdam, N. Y.

The James MacNaughton Co., Buffalo, N. Y., has been chartered with a capital stock of $100,000 to manufacture motors, engines, machinery, etc. The incorporators are: James MacNaughton, Charles S. Chamberlain and M. C. Ashford, all of Buffalo, N. Y.

The Bowers Steel Stamping Co., New York, has been incorporated with a capital stock of $50,000 to manufacture engines, boilers, machinery, etc. The incorporators are: John Charles Powers, No. 3304 Glenwood road, Brooklyn; Phillip A. Decker, No. 157 West 123rd street, Phillip A. Decker Jr., No. 319 West 124th street, New York.

The Friberg Iron Foundry, Brooklyn, has been chartered with a capital stock of $5,000 to manufacture castings and conduct an iron foundry. The incorporators are: Charles A. August and Ernest E. Friberg, both of Newdorp, Staten Island.

The Consolidated Construction Co., Mena, Ark., has been incorporated for $25,000 by A. Q. Nash, J. B. McMahon and M. C. Morris, to do railroad and bridge construction work.

The Henry Clay Coal & Coke Co., Lookout, Ky., has been incorporated with $50,000 capital stock by Wm. J. Beury, of Algoma, W. Va., J. W. Cockill, of Pennington Gap, Va., and others, to mine coal and manufacture coke.

The Manufacturer's Machinery Co., New Orleans, La., has been incorporated with $10,000 capital stock to act as agents for northern machine manufacturers, to operate machine repair shops, and to manufacture under a number of patents. Sidney Marshall is president; Harry K. Ivens, vice president and Walter M. G. Gates, secretary and treasurer. The company will be located at 734 to 736 Baronne street.

The Platt Mfg. Co., Kansas City, Mo., has been incorporated with $10,000 capital stock to operate brass and iron works. M. R. Platt Jr., is president and treasurer, and T. R. Tillson, vice president. The business is at Twenty-first and Campbell streets.

The John Deere Plow Co., St. Louis, Mo., has been incorporated with $250,000 capital stock, to manufacture and deal in farm implements. C. W. Mansur, Alpha T. Stevens and Frank A. Sprague are among the incorporators.

The Perry Machine Works, Norfolk, Va., has been incorporated with $25,000 capital stock to deal in engine machinery, boilers and mill supplies. T. A. Perry is president and B. C. Pollard, secretary.

The Elastic Nut Co., West Orange, N. J., will deal in iron and iron ores, and serve as mechanical and electrical engineers, machinists, metal workers, etc. The capital stock is $125,000 and the incorporators are: William D. Sargent, West Orange, N. J.; William Conover, No. 502 West 151st street, New York; and George H. Sargent.

The Woodward Machinery Co. will deal in machinery etc. The capital stock is $5,000 and the officers are: President and treasurer, Grosvenor Calkins; clerk, L. J. Carr, No. 20 Mill street, both of Boston.

The Hart Valve Co., No. 428 Market street, Camden, N. J., has been chartered with a capital stock of $150,000 to manufacture valves, tools, etc. The incorporators are: Walter and George Hart, No. 1157 Erie avenue; Isaac B. Maitland, No. 619 Campbell street; George W. Flemming, West Fourth street; Albert M. Munzinger, No. 1142 Fourth street, all of Williamsport, Pa. and Thomas B. Hall, Camden, N. J.

New Construction:—

The Southern Steel Co. has ordered a part of the machinery which will be needed in the nail mill which it will erect on the site of the one recently burned at Ensley, Ala. The new mill will be larger than the one destroyed, and will possibly be ready for operation within 60 days. The wire fence department is also to be enlarged and supplied with new machinery, which will increase its capacity about 50 per cent.

The Bond plant of the American Radiator Co. at Buffalo is rapidly nearing completion. The assembly building is of steel, concrete and tile construction, 100 feet by 200 feet. The pattern shop is 100 by 175 feet. Plans for other buildings are under advisement.

The Greenville works of the Carnegie Steel Co., Greenville, Pa., which were seriously damaged by fire Jan. 11, are being rapidly rebuilt. The 8-inch mill has already been started and the 10-inch mill is expected to start very shortly.

The Atlas Brass & Copper Co., Trafford City, Pa., recently incorporated with a capital stock of $750,000, will erect a large plant for the manufacture of copper and brass tubing, sheets, rods, etc. The president of the company is James Hay, also president of the Ruud Mfg. Co., Pittsburg, Pa. It is stated that a large part of the output will be used in the manufacture of the Ruud heaters.

The Iroquois Machine Co., 150 Nassau street, New York, is in the market for a large amount of additional machine tool equipment. The company's business has increased very rapidly and it has been found necessary to increase the floor space about 40,000 square feet.

President Duntley, of the Chicago Pneumatic Tool Co., has ordered the enlargement of the Philadelphia plant of the company. The capacity of the Franklin plant is also being increased.

The Perry Fay Mfg. Co., Elyria, O., announces that it will erect a factory building and equip it with automatic machinery for the manufacture of brass, steel and iron screws, nuts and other parts.

The American Sheet & Tin Plate Co. is to make a number of additions to its Aetna-Standard works. The galvanizing department will be extended by a new building 70 by 70 feet, a 50 by 100-foot addition to the roofing department, and a new warehouse 50 by 150 feet. Cranes and other equipment will be required.

The Lima Locomotive & Machine Works, Lima, O., has bought additional real estate, and it is reported will extend its shops in the spring.

The New Century Wire Fence & Post Co., Toledo, O., recently incorporated, expects to erect a building for the manufacture of wire fence and steel fence posts. C. F. Black, 2411 Summitt avenue, Toledo, is interested.

The Hart Grain Weigher Co., Peoria, Ill., has begun work on an addition to its factory 50 by 132 feet. It requires little equipment, as its cupola capacity is ample.

The Kansas City Bolt & Nut Co., Kansas City, Mo., it is reported will erect two additional buildings, one 75 by 100 feet, and one 40 by 125 feet, in the near future. A bar iron mill will be installed, and other improvements costing in the aggregate of $100,000 will be made.

The Jennings & Griffin Mfg. Co., Yalesville, Conn., manufacturer of mechanics' tools, intends erecting a one-story iron frame building, 46 x 88 feet, to be used as a forge shop.

William Ward, House building, Pittsburg, dealer in second-hand machinery, is building an addition to his warehouse, 75 x 100 feet.

The Buffalo Steam Pump Co., Buffalo, N. Y., is erecting an addition, 80 x 200 feet, to its foundry. A cupola house and core shed will be attached.

General Industrial Notes:—

William S. Cleaves, president of the Portage Lake Foundry & Machinery Co., of Houghton, Mich., has purchased the capital stock of the Hodge Iron Co., of that city. The transfer carries with it the entire plant, stock and business of the Hodge company, which will be operated hereafter under the personal charge of Mr. Cleaves. The officers of the company will be identical with those of the Portage Lake Foundry Co., as follows: W. S. Cleaves, president; George A. Royce, secretary; L. M. Cleaves, treasurer. The foundry was built in 1869 for the use of the Calumet & Hecla Mining Co.

John W. Harrison, Columbia building, St. Louis, Mo., and associates, will at once proceed to develop 3,500 acres of iron ore lands in Calcasieu Parish, La.

The L. Best Co., 45 Vesey street, New York, announces that it will carry on the business heretofore conducted by L. Best. This includes the exclusive agencies for the sale of Sterling emery and corundum wheels, and the manufacture and sale of emery grinding and polishing machinery and polisher supplies.

The Loy-Wilson Foundry & Machine Co., Aurora, Mo., is erecting a foundry 48 by 66 feet, a machine shop 36 by 80 feet and a blacksmith and power shop 36 by 48 feet. The company has purchased the Chanute Iron Works of Chanute, Kan., which will be removed to Aurora. Its specialty will be the manufacture of cable plunger pumps. Some new machinery will be required.

The Green Bay Foundry & Machine Co., Green Bay, Wis., has acquired the plant and will succeed to the business of the Western Steel Gate Co. John J. Arvey, H. L. Indra and E. P. Miller, constitute the new firm.

The Niles Tool Works Co., of Hamilton, O., has elected the following officers: J. K. Cullen, president; George T. Reiss, vice president; Charles L. Cornell, treasurer; J. L. Blair, secretary and Lucius B. Potter, assistant treasurer.

Robert Angst, chief engineer of the United States Steel Corporation's railway interests at the head of the lakes, reports that the capital invested in ore shipping docks of the Lake Superior region totals $11,488,000. The length of the docks if placed end to end would be more than 6½ miles.

B. A. Worthington, vice president and general manager of the Wabash Lines east of Toledo is quoted as saying: "Our plans provide for double tracking the Wheeling & Lake Erie from Bedford, O., into Cleveland to give better facilities for freight to the lake ports. We also propose to increase the yards at that point. A new roundhouse and turntable and various other improvements of this character will be taken up, and when the work is finished the Wheeling & Lake Erie will have adequate terminals for its freight traffic. The Wabash expects to enter into the coal and ore traffic to a considerable extent and the bulk of this business will be handled from the Cleveland docks. It is probable that work on the proposed improvements will be started in a short time, and by the opening of lake navigation in the spring the most of the work will have been finished."

The Superior Coal Co., Jackson, O., through M. L. Sternberger, president, has transferred its property to the Superior Coal Co., a New York corporation, for $4,000,000. The Superior company is the largest producer of coal in southern Ohio, and the transfer includes about 20,000 acres, as well as the personal property and equipment of the mines.

A large building in Reading, Pa., has been leased by D. B. Hoffer & Sons, of Lebanon, Pa., where they will carry a large line of Springfield gasoline engines, second-hand machinery, engines, boilers, etc. A repair shop will also be maintained.

Furnace Activities:—

The McKinley blast furnace of the Carnegie Steel Co., at New Castle, Pa., has closed down for extensive repairs. It has been running continuously for a long period.

The Rockdale furnace, Rockdale, Tenn., was put in blast Jan. 27.

The Princess furnace, of the Princess Iron Co., Glen Wilton, Va., was blown in Jan. 8.

January proved to be a record month for No. 2 Sheridan furnace, at Sheridan, Pa., 4,030 tons of high grade foundry iron being turned out.

The blast furnace of the Norton Iron Works, Inc., Ashland, Ky., is being repaired and will probably be blown in about March 15.

Fires:—

The Taunton Wire Nail Co., Taunton, Mass., on account of its recent fire has been compelled to move its entire plant into the large building formerly occupied by the Albert Field Tank Co., of Taunton, where its capacity will be doubled. Considerable machinery has been installed, and the company will probably exercise its option of buying the building within the year for whch it is leased. The loss amounted to $3,000 only.

The Toledo Boiler Works, Toledo, O., was badly damaged by fire Feb 7, when a loss of about $4,000 was incurred. Some $10,000 worth of boilers under construction were not damaged, however, and the plant has resumed operations.

The blacksmith shop of the Southern Railway Co., at Spencer, N. C., recently burned with a loss of $20,000. H. B. Spencer, Washington, D. C., is general manager.

The Owassa Mfg. Co., Malvern, Ark., sustained a loss of $35,000 when its machinery and supply plant was destroyed by fire Jan. 28.

A small blaze at the plant of the Fagan Iron Co., Jersey City, N. J., Jan. 31, was extinguished with a slight loss. This is the third fire since last May, the two former ones having resulted in considerable damage.

The foundry and machine shop of John R. Cook, Centerville, Md., was destroyed by fire Feb. 2 at a loss of $3,000.

The plant of the Portsmouth Stove & Range Co., Portsmouth, O., burned Feb. 8 with a loss of $75,000.

The works of the Southern Iron Car Line, Atlanta, Ga., were damaged to the extent of $10,000 by fire Feb. 3. The paint and oil shops were totally destroyed, as were a number of new cars.

Trade Notes:—

The Wm. Tod Co., Youngstown, O., it is reported, has secured a contract for three reversible engines for the Bethlehem Steel Co., Bethlehem, Pa. The contract involves about $200,000.

The Crocker-Wheeler Co., Ampere, N. J., reports that its business during 1905 exceeded that of the record year of 1903. The extent of this progress was announced at the recent officers' and branch managers' convention held at Ampere, the success of its alternating current line being especially noteworthy. Two other lines of electrical machinery will soon be placed on the market.

The Bucyrus Steel Foundry Co., Bucyrus, O., has closed with the Ft. Wayne Electric Works for the electrical equipment of its new plant, and with the Bass Foundry & Machine Co. for engines and boilers. Machinery contracts call for May 1 delivery, and the building contracts call for completion June 1.

The Republic Iron & Steel Co. has recently completed the purchase of two additional Allis-Chalmers vertical, high and low-pressure, long crosshead blowing engines for installation in that company's plant at Youngstown. These engines are practically duplicates of three other furnished less than a year ago, two of the high-pressure and one of the low-pressure, vertical long crosshead type. The new engines will have high-pressure 52-96-inch and low-pressure 96-96-inch steam and air cylinders with 60-inch stroke, each with a capacity of 45,000 cubic feet of free air per minute. It will be interesting to note in connection with the manufacture of engines of this type that of all those installed in the steel producing region throughout western Pennsylvania and eastern Ohio, the Allis-Chalmers Co. alone has furnished upwards of 130 complete units for use in mills which produce more steel than any other equal area in the world.